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SIR HENRY CLAY

SIR HENRY CLAY

SIR HENRY CLAY, an Editor and one of the founders of this Journal, died on July 30th after a road accident in Holland. He was born in 1883; his father was the head of a firm of dyeware merchants in Bradford. Educated at Bradford Grammar School and University College, Oxford, where he read Greats, he was one of the economists whom Oxford nurtured before she had a school of economics (though the Drummond Chair of Political Economy had been founded in 1825 and had been held by a line of distinguished occupants).

Of wide sympathies, Economics to him held a subordinate place in the study of social relations 'because the problems of social practice to which its study is directed are seldom purely economic, and when it comes to action the ethical aspect is always, and the political aspect is usually, more important than the economic aspect'. But the 'study of the economic element in social and political problems is essential if they are to be solved . . .' and in the same context Clay went on to emphasize the importance of economic theorizing and the disciplined study of 'the economic aspect of social arrangements' to those practical men among whom he hoped to find his 'General Reader'.

Economics, an Introduction for the General Reader (1916), from which these quotations have been taken, was, indeed, the fruit of his first work in the field of adult education, as Warden of the Neighbour Guild Settlement and in Tutorial Classes in Leeds, London, and Oxford. This was an attempt 'to do for the economic organization as a whole what Bagehot and Mr. Hartley Withers have done for a part of it . . . — to explain the principles of its construction and working in the language of ordinary life, and with reference to the experience and interests of the ordinary man.' The result has become a classic in England, and successive generations have made a sound beginning in Economics with its help.

It is interesting that the reviewer of this book for the *Economic Journal* referred to the lucid and suggestive qualities of the section on wages. Clay, to whom Economics was a 'study for action', became increasingly interested in labour problems and during the latter half of the 1914-18 war he served in the Ministry of Labour. Later, various essays from these interests were published in *The Problem of Industrial Relations* (1929). Meanwhile, he had served on the 1925 Economic and Wage Commission of South Africa. Being concerned with the influence of public wage regulations, the commission's inquiries went deeply into factors affecting South Africa's industrial development and especially into the problem of coloured labour. The

consequent report which Clay prepared with two of his colleagues was judged by Sir Arnold Plant in the *Economic Journal* to be 'a monument to its authors'.

After the War, some of the larger Oxford Colleges began to make the first appointments of regular tutors in Economics which foreshadowed the creation of the modern Honour School, in which Economics, agreeably to such minds as Clay's, is linked to the study of Politics and Modern History and to the more abstract discipline of Philosophy. In 1919, he was delighted to be appointed to a Fellowship at New College and though he was to leave in 1922 to take up the Jevons Chair of Political Economy at the University of Manchester, he retained a keen loyalty for New College.

At Manchester, he continued his general interest in social problems which was signified by his translation in 1927 to the Chair in Social Economics which was created especially for him. Lancashire and neighbouring industrial areas offered a constant call to the study of the plight of Britain's older industries. These, the original breeding ground of that private enterprise system in which he had instinctively greater trust than in any system of completely centralized direction, seemed to Clay to offer scope for organized self-help and for institutional aid whilst preserving the complex competitive fabric on which they could rely in health. When the Great Depression was superposed on post-war decline, the Bank of England took an interest in the reconstruction of depressed major industries and Clay accepted an invitation to join the staff of the Securities Management Trust, becoming in 1933 Economic Adviser to the Bank itself. In this role, he gave much study to particular problems in the fields of money and of international trade as well as to the structural problems of industry. In 1933 he went to the Argentine with Sir Otto Niemeyer, who had been invited to advise upon banking organization. In the Report which Sir Otto Niemeyer presented to the Argentine Government, recommendations were made for the formation of a Central Bank, for parallel legislation on certain aspects of banking generally, and for changes in the form of Public Accounts. The establishment of the Banco Central de la Republica Argentina followed in 1935.

It is hoped that it may be found possible to publish some of the memoranda for which Clay was responsible during his work at the Bank. They should add considerably to our understanding of the position and problems of Great Britain and the Commonwealth during this period.

Such work brought Clay into frequent contact with men of affairs and these came to appreciate his gentle shrewdness and his

capacity for lucid analysis whilst not losing sight of practical complexities and difficulties. He thus developed into an important economist in what we like to think of as the classical tradition in England. With his great competence, it is unfortunate that he did not contribute more to economic theory, especially during the 1930s, when so much new thinking was taking place. In the debates in which the newer theories were forged, we too often lacked reminders of the way things really worked out — the practical knowledge which lay behind Marshall's theoretical structures, for instance — and at many points what Clay would have felt to be negative, destructive criticism would have had positive value.

Clay retained his respect for the traditional theory and in particular for the work of Alfred Marshall and D. H. Macgregor. For the broad handling which is required in most social problems, he was sceptical of the practical value of many later developments and it is significant that he left his *Economics for the General Reader* substantially unchanged in successive reprints (except for moving upwards the price of the famous shirt in response to the requests of readers coming to the subject after intervening inflations!).

But he believed in theory — as witness, to intrude a personal note, his great pleasure when Professor Hicks accepted a Fellowship at Nuffield — and believed in the theorist pursuing his inquiries to whatever constructions and conclusions he was inclined. His work, however, had convinced him that in economics, above all, it was a tragedy that so much theoretical speculation went on without continuous and natural contact with the everyday business of life. He was always impressed with the infinite variety of the practical problems of industry, for example, and had an inculcated respect for the 'naive' theorizing of business men about the economics of their own particular sphere. It seemed to him a pity that so much academic work should issue in prescriptions which were not obviously applicable in the world of affairs and should disregard so much the accumulation of detailed evidence which practical affairs provided.

Nevertheless, he believed that all too often business lost because it did not have ready access to the contact and advice of economists, for although he 'had a deep respect for the empirical judgment of the business man' there were 'circumstances in which experience can be misleading'. At the same time, the scepticism which most business men displayed towards some of the most confident claims of economists ('or their political disciples') should 'be a warning to the economist that he may not have allowed for all the elements in the problem'. And if the business man had need of the specialist services of the economist, 'on his side, the economist has equal or greater need

of access to actual business experience'. (These quotations come from Clay's article on 'Economics and Business' in Unilever's magazine *Progress*, 1953.)

Such beliefs led to his intimate connection with the National Institute of Economic and Social Research, London, and Nuffield College, Oxford. The former was founded in 1938 and had for its purpose 'the advancement of knowledge of the social and economic conditions of contemporary society by means of research'; its Governing Body is drawn from academic social scientists and from distinguished public servants and business men. As its President for many years, Clay played a large part in its foundation and development.

Founded as Nuffield College was, 'to encourage research especially but not exclusively in the field of social studies, and especially by making easier the co-operation of academic and non-academic persons', it was understandable that Clay did not feel able to refuse to become its Warden when the end of the war made practicable the establishment of the College. He helped tremendously to preserve its unique character whilst safeguarding its development as a College in the Oxford tradition in which its individual Fellows should have the independence of their scholarship.

Clay attached importance to the Visiting Fellowships whereby persons distinguished in practical affairs were brought into the Governing Body of the College and did much to make their contribution effective during the difficult period before the College acquired its own home. At the same time Clay helped the College to keep clear of the danger that interest in contemporary problems might lead to programming research for non-academic reasons. He sustained a vision of the College as a society of Fellows and Students, and refused to direct it into the narrower paths of a research institute.

He had always made it plain that he was mainly concerned with the practical foundation of the College and resisted much pressure to stay on beyond the period of years he had set. He had work which he wished to do himself and for which he could not find time whilst he remained at the head of this new College. On his retirement from the Wardenship, he could rejoice in the signs inside and outside the young society that it had become well and truly established, so that its future development could lie in other hands.

One immediate task which Clay wanted to carry out was the writing of the biography of his friend, Montague Norman, Governor of the Bank of England. It is good news that this had got so far that it will be possible for it to be completed by someone else. Beyond this, with the support of a second happy marriage, he could look forward to many years of work and his friends hoped that in one

way or another the world would get the benefit in lasting products of his unique gifts and experience. The accident last summer has deprived us of much that was hoped for.

In his retirement, Clay could not lose touch with practical affairs. He was particularly pleased at his association as Economic Adviser with the Unilever organization. This post, in itself doing no more than formalizing his availability for consultation by its head who was an old personal friend, soon led to much more activity as, to his modest surprise, many individuals found their way to the office which he inhabited when he was in London. Sir Geoffrey Heyworth has written of Clay's work here: 'He had built a unique place for himself . . . in a very short time. He had a peculiar combination of consideration for others, gentleness and effectiveness that made him an ideal adviser.' He thrived on this and his other continued contacts with the world of affairs.

With his liking for his fellow man and with others' appreciation of the intellectual and social gains from Henry Clay's company, it is not surprising that he did so much occasional work in connection with the Political Economy Club and other more restricted discussion circles where current affairs and continuing social problems were considered in Manchester, London and Oxford. (He was a founder member of the Oxford Management Club, which brings together business men and academics to explore a common interest in management.) It is to the prompting of such contacts that we owe many of his occasional articles which bring balanced wisdom and a longer-range standpoint to difficult contemporary problems. The article which we have the honour to publish in this number had such an origin, although in his present form it was specially written for us. Concerning such articles, as in discussion with Clay himself, it was perfectly in order to disagree with his conclusions, but one always did well to pay attention to the practical generalizations and observations on which his conclusions were based.

It will have been clear already from this brief account of Clay's professional life why he should have been a founder of the *Journal of Industrial Economics* and so strongly supported our efforts to get a discussion of industrial matters which was relevant to the development of academic economics in this field, but to which at the same time men with practical experience would contribute as well as those with professional academic interests. Apart from his wise advice and ready help in the seeking of appropriate articles and authors, Clay did his full share on the routine editorial side. Never niggling in his criticism of an article, he always went briefly to the essential points which might help the author in his exposition of his subject and

which might remind him of pertinent questions which arose from the article.

This note has been much concerned with Henry Clay as an economist interested by nurture, inclination, and experience, in industrial affairs. What no note can properly record is the personality that played so great a part in any contact with him. There were other things in life to him than Economics, and his subject benefited by his freshness due to his interests (all shared by his family) in art and music, as well as in his hobby of sailing (through which, as Commodore, he greatly encouraged younger members of the University Sailing Club).

His contacts with practical affairs, and especially his work for the Bank, brought him into touch, as might be expected, with business men, bankers, and politicians, not only in Great Britain but also in Europe and the United States. The introductions he was able to give to research workers who required such contacts soon gave evidence of the considerable extent to which they had ripened into firm friendships which had been sustained by correspondence and visits despite all the pressures of everyday life.

To Henry Clay, behind all the abstraction of economics, there was the reality of the individual human being going about the 'ordinary business of life'. This reality interested him as much for its own sake as for the professional value of the study. It will be clear that such study was facilitated by his own personality and the sympathetic reactions it evoked in others.

Clay was not a man who enjoyed posing for his portrait and so there are no academic portraits by which his friends may remember him. We were therefore very pleased to find that the happy photograph of him at the tiller of his boat was available for us to use as frontispiece.

Finally, it seemed appropriate to add a record of Clay's writings, since his articles are so scattered. This bibliography cannot claim completeness but, apart from brief reviews of the usual kind, we have included all those articles of which we are aware or could discover while this note was going through the Press.

P. W. S. A.

APPENDIX

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RESALE PRICE MAINTENANCE[1]

by Sir Henry Clay

I

It is estimated in a recent survey of Distribution[2] that between 27 per cent and 35 per cent of all consumer goods sold to the private domestic consumer in the United Kingdom in 1938 were sold at prices fixed or recommended by the producer. This estimate refers to a single year before the war; but common observation suggests that the practice is steadily extending. The same survey shows that the practice is associated with the branding of goods by the producer, with a higher than average concentration of production in a small number of firms, and with a higher than average proportion of sales direct to the retailer and not through wholesalers. Of these, branding is the most important, and is steadily extending. Branding implies the possibility of standardizing the commodity; and resale price maintenance would be difficult to apply if it were not possible to maintain the standards (and associated brands) unchanged for a considerable time.

The practice of branding, and of packing in distinctive wrappings, and the associated practice of resale price maintenance, involve an invasion by the producer of the traditional sphere of the retail distributor. They are the outcome of the tendency for producers to reach out towards the consumer and to endeavour to limit variations (both from one retailer to another and from one time to another) in type of product, price and terms of sale.

The practice of resale price maintenance has been the subject of two inquiries in the last twenty years, the Greene Committee in 1930 and the Lloyd Jacob Committee in 1949. The chief difference in the findings of the two inquiries is that the latter recommended that 'steps be taken to render illegal the application of sanctions which extend beyond the remedies open to an individual producer for any breach of resale price maintenance conditions'; whereas the Green Committee held that the ordinary right of freedom of Contract ought not to be withdrawn without compelling reason, and was 'not satisfied that if a change in the law were made there is any reason to think that the interests of the public would be better served'.

[1] This article was written by Sir Henry Clay in 1951; it was revised by him soon afterwards with a view to later publication. His death has unfortunately prevented him from commenting on any more recent developments which might have interested him. We are indebted to Mr. J. A. Clay for seeing the manuscript through the press.

[2] *The Distribution of Consumer Goods*, by James B. Jefferys, p. 112. Cambridge University Press, 1950.

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There is a *prima facie* justification for a practice which all the interested parties — manufacturers, distributors, and consumers — favour, as the witnesses, with very few exceptions, testified to the Lloyd Jacob Committee. An analysis of the operation of resale price maintenance points to economies both in manufacture and in distribution.

Standardization makes possible the mechanization of packaging and branding, one important element of manipulation in distribution, and simplifies the other elements. Only by the concentration in a smaller number of channels than the thousands of retail distributing points is there scope for automatic sorting, grading, weighing, packaging and labelling.

Again, the constant quality, which is essential to securing the consumer's confidence in packaged goods, requires usually an organization for testing commodities which is beyond the scope of most distributors. For concentration, which makes possible mechanical packing, offers scope also for more scientific methods of routine testing. These merge imperceptibly into research, directed to removing defects, standardizing quality, and improving quality; a function that can be done more effectively in contact with the manufacturing process than at the retailing end.

In taking over in this way an important part of the functions of the retailer, the manufacturer is aiming at another economy — mass production, on the basis of an organized flow of work and maximum mechanization in manufacture. This requires as regular a volume of output and as uniform a product as it is possible to secure, and the producer is always striving after distributing arrangements which ensure him these conditions. By branding and giving constant quality at a constant price he increases his hold on his particular market, and by lessening the variability in his sales improves his chance of planning his production systematically.

These are 'productive' economies: there are equally real economies in the final process of distribution. The consumer is saved the time involved in testing, judging and assessing a large number of commodities, bought often in small quantities on a large number of occasions. He is rendered less dependent on the retailer's expert or disinterested advice, and saved worry over both price and quality. All this is a saving of labour, though most of it is consumer's labour and, as such, unpaid; but the development also makes possible the release, by distribution, of skilled workers for industry and other services.

The development also favours the extension of the most economical

method of distribution, the method of self-service; while this is influenced by other conditions, it is greatly facilitated by the offer of commodities with an assurance of constant quality and uniform price. Manufacturer and consumer both absorb some of the traditional functions of the retailer, and the retailer is left to earn his profit by widening his range and increasing his turnover.

These economies in manufacture and handling arise mainly in connection with the practice of branding; it is not an accident that resale price maintenance is, as the Lloyd Jacob Committee point out, 'almost always associated with branded goods'. But the basis of the economies secured is volume of uniform production; on this depend the possibilities of mechanization and the use of methods of mass salesmanship such as advertisement. Now the interests of manufacturer and retailer diverge when they operate on a different scale.

Usually the manufacturer wishes to limit the number of types and varieties he produces in order to secure the maximum amount of repetition in production, whereas the retailer wishes to diversify and multiply types in order to identify with himself something distinctive. In trades like the textile trades, in which the manufacturer usually has no contact with, and little opportunity of influencing, the consumer, so that he is entirely dependent on successive layers of distributors for his outlet, he is constantly fighting against the tendency of distributors to identify his product with themselves, particularly by slight variations in the structure of a cloth, with the result that the manufacturer is denied the advantages of uniform mass production. It is of course possible for a retailer with a very large turnover of an article to co-operate with manufacturers in reducing the number of varieties; a different conflict of interests may arise here, forcing on a number of small manufacturers a restriction of variety which does not suit *their* scale of manufacture or exploit their possibilities.

However, the chief conflict is between the retailer, who wants to create a good-will for himself by offering something different, and the manufacturer, who wants to get as near mass production as his product and market will permit; association between manufacturers when there are many of them catering for the same market, may be the only way of resisting the pressure of retailers and securing the economies of standardization of a limited number of varieties.

III

The chief reason for associating a resale price with branding is that it conduces to this standardization. The price becomes part of

the brand. The manufacturer is thus drawn into the traditional province of the retailer by three considerations:

(i) Uniform price gives a great re-enforcement of the faith he creates in the consumer's mind in the quality of his product. A principal object of branding is to secure a return for the care the manufacturer takes to provide good and uniform quality; if the consumer finds that the price varies in different shops, he may become suspicious, and fear adulteration or variation of quality, with the result that his trust in the product is undermined;

(ii) The manufacturer seeks not only a large volume, but a uniform flow of demand, as a basis for his manufacturing. A policy of reorganizing production on the basis of expensive mechanical equipment and specialization of stocks may not justify itself, if continual shift and fluctuations of demand leave this expensive equipment idle, while the capital charges have still to be carried. Such fluctuations will occur if retailers find that they are losing custom to a competitor who has cut prices temporarily, and give up stocking the article; or if retailers put up prices to consumers in a temporary shortage to a level which alienates the consumer.

The manufacturer's capital expenditure compels him to take a long view; the retailer is tempted to take a short view and go for quick profits which defeat the manufacturer's policy. The manufacturer cannot, of course, hope to escape the effect of large fluctuations in the consuming public's income, or big shifts of demand from one field to another. Except that price-cutting in a falling market is more likely to deter buyers, in the hope of further cuts, than to attract them, these are largely independent of price maintenance. But the economies of mass-production depend on taking a long view and operating on a budget; and the manufacturer must know the price he is to work on, adjusting it at intervals as he has to, not have his calculations continually upset by irregular price movements caused by competition among retailers of very varied ability and resources.

(iii) In the third place — and here the manufacturers' reasons coincide with the retailers' reasons for preferring resale price control — a uniform resale price also reinforces the ties he has with retailers, because it acts as a protection to the retailer. That consumers should be able to buy at different prices in different shops articles, which the manufacturer has

not only gone to immense trouble to render identical or uniform in quality, but has also guaranteed to be identical or uniform by branding — articles, moreover, which are commonly put up in such a form that the retailer has no handling or packing to do — is as dislocating to the retailer's plans as to the manufacturer's. The competition in price-cutting, to which the retailer may be driven to resort, so long as he acts individually, does not necessarily provide a basis for any systematic development even of his business, because he cannot know when or where it will end. In the majority of cases, therefore, the retailer welcomes action by the manufacturer, or organizes it in association with other retailers, to enforce a uniform price corresponding with the uniformity of product and uniform work involved in handling. By his action the manufacturer ties the retailer to him and, so far, is enabled to plan his manufacturing more systematically and economically.

Resale price maintenance is only one aspect of a general trend towards the assumption by the 'producer' of more and more of the function of distribution. Fundamentally this trend is the outcome of the more systematic planning of production, which is forced on the producer as production is more intensively capitalized, in order to ensure against the waste of idle capital. It is not confined to the domestic trade in consumers' goods.

For example, one of the striking developments of the inter-war period was the progressive expansion of sales by new industries which cut out as many middlemen as possible and pushed their products through their own up-country organization in overseas markets. Tobacco, petroleum products and fertilizers were examples in Indian markets, in which industries like the textiles already referred to, which clung to the traditional method of selling to middlemen, and took no further part in pressing or pricing their products, were rapidly losing ground. Doubtless an important factor in the contrast was the advantage which 'new' industries have over old ones, but the contrast remains significant. These large, new, heavily capitalized industries did not feel that they could disinterest themselves in the ultimate distribution of their products and the ultimate pressure applied to induce consumption, and accordingly reached out past the intermediaries as near to the ultimate consumer as they could get. The 'producer' cannot ignore the price-policy of the retailer; and it is unlikely that he will incur the expense and risks of large capital expenditure, if he is not allowed to interest himself

in the policy and practice of the retailers through whom alone he reaches his ultimate consumers.

IV

In the evidence of distributors and manufacturers summarized in the Lloyd Jacob report (paras. 33-46), supporting resale price maintenance — and the evidence of the attitude of consumers[3] was equally unanimous and favourable (paras. 47-50) — one exception is mentioned, viz. 'certain large-scale multiple retailers', who impressed the committee as being 'progressive in outlook'. The committee also devotes a large part of its report to an examination of the claims of opponents of resale price maintenance 'who maintain that, whatever the views of interested parties, and whatever benefits it may confer on individuals, its effects on public interest are harmful'. The objections raised depend on certain alleged consequences of resale price maintenance.

Thus, there is a general objection to the manufacturer's interference with the fixing of retail prices, unless he takes it over altogether by doing his own distribution. He is entitled to fix (so far as he can) the price at which the retailer takes over his product: but the price at which the retailer passes it on to the consumer is not his business.

This objection is grounded more specifically on two consequences. First, resale price maintenance involves a uniform charge for retailing irrespective of the variation in retailers' costs. 'Clearly', the report states, 'if the proposition were true that for all practical purposes distributors' costs are and must be uniform, the arguments against fixed margins would lose much of their force' (para. 56); and the report proceeds to demonstrate that they are not uniform.

The second is the elimination of competition. Fixed margins lead to 'rigidity throughout the distributive structure'; hamper the development of distribution 'on a basis of low prices and small services'; involve the basing of margins by reference to the class of distributors whose costs are highest. The committee 'can see no case for a comprehensive and widespread system designed to eliminate it (competition) altogether'.

It is not clear in what way resale price maintenance is inconsistent with variations in retailers' costs. The 'mark-up' on particular commodities, which is the purpose of most resale price maintenance agreements, is a different thing from the cost of running a retail establishment as a whole. The former is a factor, but only one

[3] National Council of Women; National Federation of Women's Institutes; Women's Co-operative Guild.

factor, in the latter; there remains ample scope for exploiting different methods and differential efficiency, while observing fixed margins on a fraction of the commodities handled. Even when the retailer is specialized to price-maintenance articles, his costs — and profits — do not depend solely, or mainly, on the mark-up on his sales but on his ability to attract custom and increase turnover. Managements do not all make the same profit. To identify distributing costs as a whole with a fixed 'mark-up', on particular articles, is to confuse two different and largely independent things.

The possibility of competition between retailers, in spite of fixed margins on particular articles, has a bearing on the fears that competition is being eliminated. There is no evidence that large-scale multiple retailers are losing ground to unit retailers; or that department stores are. Quite the contrary; one motive that predisposes the manufacturer to insist on uniform margins on his particular products is his dependence on unit-retailers, who were still handling two-thirds of the retail trade of the country in 1938, and the necessity he is under of assisting to prevent, so far as he can, what they would regard as unfair competition. Moreover, resale price maintenance, so far from eliminating competition, tends to break down perhaps the most important traditional limitation of competition, viz. the customary practice in certain trades of applying a uniform mark-up to all sales in the trade and not (as under resale price maintenance) to particular commodities.

The manufacturer's justification for participating in the control of distribution of his particular products, arises, as has been suggested, from the fact that the functions of manufacture and distribution are not separable, in practice as distinct from theoretical analysis; the manufacturer is inevitably implicated in the results of the distributive process. This is not only because, in the case of branded and packaged articles, the manufacturer has taken over a large share of the actual work of distribution; it arises much more from the effect of the distributor's action on the price the manufacturer receives. Constant price is the correlative of constant quality and uniform marks. Variations in price from one shop to another would excite the same doubts and hesitations in the consumer's mind as variations in quality, lead to defection of customers, and obstruct arrangements which are based on a regular flow through the productive process. This dislocating influence is generally admitted when a branded product is offered temporarily as a 'loss-leader' at a price which bears no relation to its long-term cost; but such sales, from the point of view of the producer, differ only in degree, not in kind, from other price variations.

In the first instance, no doubt, the manufacturer is concerned only with the price at which the retailer takes over his product, and not with the ultimate price to the consumer. But this is only the first reaction. The take-over price which the manufacturer can secure depends on the price which the retailer receives; and, if one retailer begins price-cutting, whether because his costs are low and he wants to expand his business, or because his costs are high and he is desperate, others will retaliate, and the pressure will be transmitted backward to the manufacturer. It is impossible to attribute precise operating costs to particular articles; it is impossible therefore to say at what point the sale of an article as a 'loss-leader' begins. The manufacturer of a branded article endeavours to reduce the work involved in retailing his product to a point at which it is not unreasonable to assume that the cost of handling that particular article does not vary widely between different retailers, and not unreasonable therefore to insist upon the same mark-up.

V

The impossibility of disentangling completely the producer's and the distributor's interest in the process of fixing the retail price has an important bearing on the chief difference between the recommendations of the Greene and the Lloyd Jacob committees. The latter, like the former, upholds the right of the individual producer to prescribe and enforce resale prices for goods bearing his brand, and recommends that no action be taken to deprive him of this power; but recommends that steps be taken to render illegal the application of sanctions which extend beyond the remedies open to an individual producer for any breach of resale price maintenance conditions.

The explanation of the manufacturer's resort to such sanctions is that in most cases it is only by collective action that he can enforce prescribed prices and conditions; to deny him this power is to take away in practice the right to control the resale price of his product which is recognized by the Committee in principle. Only the producer who produced so large a proportion of any class of goods that distributors could not dispense with supplies from him would in fact, apart from collective action, enjoy the power recognized as the right of all producers of branded articles.

In effect, the Lloyd Jacob Committee's proposal to make collective enforcement of resale prices illegal is equivalent to prohibiting collective bargaining between producers and retailers. The committee point out that the early history of resale price maintenance in this country is one of distributors' attempts to organize themselves in such a way as to bring collective pressure on manufacturers of

branded lines to fix and enforce retail prices for their goods. The objection that such collective action involves 'interfering with the terms on which the distributor disposes of *another* manufacturer's goods' is identical with the objection of individual employers to allowing conditions in *other* establishments to determine the wages they should pay. Collective bargaining developed, and trade unions were given by Parliament a legal status which facilitated it, because individual bargaining in wage-fixing did not secure the minimum rates and conditions which were the chief object of trade union policy; in its absence the weaker, more hard-pressed, or 'less acquisitive' wage-earners accepted rates below the common standard, other employers were forced by competition to insist on similarly cut rates, and the standard rate was lost. The pressure on prices produced by unrestricted competition was transmitted back to the partner in the productive process in the weakest bargaining position, the wage-earner, and deprived him of any security.

The interest of the great majority of retailers is still in maintaining this collective determination of margins on prices, since their weaknesses are essentially the same as those of the wage-earner; their numbers are so large that it is easy to dispense with any individual, they are specialized to and dependent on their trades, and they have not individually the reserves necessary to support individual bargaining. Mr. Jefferys[4] gives the following estimate of numbers concerned with consumer goods (excluding alcoholic liquors) and numbers of unit retailers in certain trades:

Type of Shop	*% of Total Sales*	*No. of Shops*	*% of Total No. of Shops*
Unit Retailer	66.0	657,000	88.0
Multiple Shops	18.5	66,000	9.0
Co-operative Shops	10.0	24,000	3.0
Department Stores	5.5	425	—

Type of Trade	*Estimated No. of Unit Retail Shops*	*Type of Trade*	*Estimated No. of Unit Retail Shops*
Bakers	24,000–28,000	Confectioners	45,000–53,000
Dairies	16,000–19,000	Tobacconists	20,000–24,000
Grocers	65,000–75,000	Newsagents	19,000–22,000
General Food Dealers	65,000–85,000	Stationers	4,500–5,500
Chemists and Druggists	15,000–16,000		
Cycle and Motor Cycle Dealers	9,000–11,000		
Electrical and Radio Dealers	19,000–23,000		

The average staff per shop is small — 2.4[5] so that in respect both

[4] *The Distribution of Consumer Goods*, by J. B. Jefferys, pp. 129, and 120-1. Cambridge University Press, 1950.

[5] It is estimated that, at the time of the last Occupational Census, 1931, the proportion of proprietors and managers to salesmen and shop-assistants was as high as 1 to 1.4 for retail trade as a whole – Douglas, *Journal of Royal Statistical Society*, XCVIII, p. 464.

of numbers and of bargaining strength the unit retailer is in much the same position as the wage-earner. Under pressure he is likely to cut margins, which correspond with wage-rates in the trade union field, and cutting tends to spread.

A firm in a dominating position can tolerate variations, and even practise a policy of discriminating prices, because such discriminating price-cutting may lead to a more than proportionate increase in sales, while the dependence of the market on the firm ensures against a spread of price-cutting which it cannot control. But for most producers a uniform price is both simpler and safer.

The retailer must in any case face fluctuations in income from which the wage-earner is shielded, since the retailer has direct relations with the commodity market and a proprietary interest in the goods he handles; he can, however, limit these to fluctuations caused by general trade conditions and to variations in his turnover and efficiency by using the wage-earner's safeguard of collective bargaining to establish standard terms for the service of actual distribution.

Where the manufacturers also of any commodity are numerous, still more if they are also small, they have the same incentive to impose some restriction on individual bargaining in order to supply an element of security and continuity in the returns on which they have to base their plans for production.

As employers of labour, producers have learned the advantages of collective bargaining to establish common rates and conditions; they naturally apply the same method to their relations with a multiplicity of distributors. Both, in many trades, take advantage of the law to register as trade unions.

It has already been noted that it is not practicable to allocate costs specifically to particular commodities. Bargaining is therefore unavoidable; the only question is whether it should be collective or atomistic. In the past the chief influence was the rates of mark-up applied generally by custom in a trade. As the market has widened, the big retailers extending their influence into what was formerly local enclaves of limited competition, something more definite and reliable has been needed than custom. Resale price maintenance is the outcome of pressure to satisfy this need; a producer with a monopoly, or near monopoly, *increases* resale prices and conditions, other producers settle them by collective negotiation. The same safeguard, in a case where a large number of small producing units is concerned, has been applied by Parliament to agriculture, by the Agricultural Marketing Acts; with safeguards for the consumer in provision for investigations similar to the safeguards offered outside

Agriculture by the Monopolies (Inquiry and Control) Act. In at least one case in which the productive units were large, Coal, compulsory joint action was imposed to check the deterioration of the industry in general and the employees in particular which unrestricted individual bargaining was producing, even before the whole industry was merged in a statutory monopoly.

The alternative solution of the practical problem of fixing particular margins or 'mark-up' (apparently favoured by the Lloyd Jacob Committee) viz. that the distributor should apply the *average* margin of his total transactions, is hardly practicable. From the point of view of the individual distributor, the cost of handling different commodities varies; he may well cut his margin on a packeted good, which he has simply to hand over the counter without examination, weighing or wrapping (without any intention of using it as a 'loss-leader', though the effect would be the same). Again, he may properly vary his margin in order to extend his sales in accordance with variations in the nature of the demand for different articles; every firm, producing as well as distributing, has to collect contributions to its overhead expenses where it can do so, and it is in the last degree unlikely that it can do so best by a uniform mark-up for overheads on everything it sells. The producer can afford to encourage a low mark-up on commodities which are easily handled; and he is under an inducement to vary his prices (including margins) in the way that will most promote his sales and enable him to cover his overheads. The consumer's interest in an adjustment of margins and prices which is not too precisely related to costs is apparent, if an extreme example of the effect of changing the distributor's *average* cost be taken; it would obviously be inconvenient to the consumer if he were confronted with a different price, varying according to the type of shop and efficiency of the individual retailer, when he purchased a newspaper, a packet of cigarettes, a bar of chocolate, or a postage stamp.

It should be observed that collective bargaining is a procedure aimed at establishing a uniform price or contract, but such uniformity is compatible with continual adjustment of the uniform price to changing market conditions, and with a wide variety of contracts. The insistence on collective bargaining does not restrict the bargain concluded to any predetermined content. The assertion that resale prices are fixed to cover the costs of the highest cost distributors has not been established by evidence; some associations claim that resale price maintenance has been used to keep prices lower than they would otherwise have been; the Government appealed to the Society of Motor Manufacturers and Traders in 1951 to extend from one to

two years its control of the resale by customers, just because second-hand prices had risen above the association's prices; but in any case it does not follow from the fact that it is reached by a process of collective, as opposed to individual bargaining. The interest of the producer in keeping the price to the consumer down to the point at which his sales are at the maximum (over a period long enough to plan production) remains predominant; just as the interest of a trade union lies in keeping up wages only to a level that does not jeopardize employment. This will lead him to give special discounts for quantity, to allow for the services of wholesaler as well as retailer, to discriminate between London and provincial prices, to give a deferred rebate to induce continuity of custom — these are examples given in the Lloyd Jacob report — and doubtless vary the content of the bargain to meet a multitude of other varying conditions. Resale price maintenance does not even involve necessarily uniform prices for the products of different manufacturers. Its basis is the maintenance of a uniform price for an *identical* article; if the products of different manufacturers are not identical, but deliberately differentiated in some respect, their prices can differ. All that resale price maintenance agreements do is to insist that the resale price fixed by the manufacturer (and accepted by the retailer) is in each case observed. Thus there will be only one price for each article. But combination is necessary to enforce this rule. Collective bargaining again may well be a surer method of ascertaining from time to time and formulating the price most likely to cover average long-term costs both of producing and distributing on the one hand, and to prevent the accumulation of stocks or maintenance of idle capacity on the other. Small producers — and sometimes also large producers — confronted with the necessity of making individual bargains with large retailers, must often be coerced into accepting a price which covers direct costs but makes an inadequate contribution to overheads; small retailers on the other hand similarly may be forced to accept less than the margin they need to perform their function.

The settlement of the terms on which distributors shall handle particular manufactured products is therefore likely to be most satisfactory if it is conducted, on one side or both, by systematic discussions between representatives of all the parties concerned, and is given a general application. Comparison with the procedure of raw produce markets, which is implied in the objection to resale price maintenance and other attempts to prevent fortuitous price variations, is misleading. In the case of raw produce, the volume of output is subject to wide variations due to uncontrollable natural

conditions, and corresponding variations in prices may be necessary to clear the market; in the case of manufactured commodities, on the other hand, all the resources of technology are directed to minimizing this influence of natural conditions and to subjecting processes of production and quality of product to scientific control. Uncontrolled individual bargaining among retailers may lead to lower prices to the consumer for a time; but if it leads also to irregularity of prices and sales, which deters manufacturers from extending the mechanization, and other methods of rationalization, of their processes, it will prevent lower prices in the long run. As with the settlement of rates and conditions of wage-labour, the collective procedure is needed for stability and long-run economy, and to avoid endless alterations to suit the transient changes in the bargaining position of individuals. It requires the only effective sanction, the right to withhold supplies collectively — the strike; a monopolistic producer can enforce his terms by withholding supplies individually; but most producers could not enforce an agreement without the right, and it is inconsistent to accord the right to protect a producer's good-will while denying him the only effective means.

If it be decided that some of the bargains resulting from this procedure are unreasonable, Parliament can regulate the scope of resale contracts without forbidding such contracts as a whole. There may well be particular incidents which have undesirable results; but to prohibit a convenient and effective procedure for reconciling the interests of producers, distributors and consumers in order to prevent particular forms or elements in the agreements they reach is unnecessary and clumsy. Existing methods of distribution, again, may be less economical than is practicable; but it is unlikely that the structure and methods of distribution can be made economical merely by prohibiting the enforcement of uniform resale agreements. The safeguard of the consumer rests in the interest both producer and distributor alike have in volume of output, in the variety of distributive agencies, none of which has a monopoly, and the possibility always open to the consumer, if he is dissatisfied with the spontaneous services of distributors, of organizing his own supplies through the Co-operative movement. None of these safeguards require the prohibition of resale price maintenance.

FUEL AND POWER POLICY IN GREAT BRITAIN[1]

by A. BEACHAM

I

THE scope of this paper is not quite as wide as the title suggests. It will be concerned mainly with the future policy of the coal industry, but this is so much bound up with what may be expected to happen in the associated power industries that it is difficult to keep them apart.

Briefly my thesis is this. Nearly everything written about the coal industry in recent years has been in terms of expanding demand, continuing shortage and the need to relieve this by increasing output to the maximum extent possible. The Ridley Committee[2] estimates coal requirements for the period 1959-63 at between 257 and 267 million tons and 'to meet prospective demands over the next decade in full the N.C.B. may have to accelerate and expand their plans for future output' (p. 13). There can be little doubt of the pressure which the Committee would like to exert on the Board in this direction. On page 12 they say 'In the national interest, however, it may be desirable that the Board should plan for a greater reserve of mining capacity than might correspond to normal commercial practice since a shortage of coal supplies at any time can easily mean very heavy losses to the country as a whole'. Even the National Coal Board's own carefully drawn *Plan for Coal* provides for a planned output of 240 million tons of deep mined coal by 1961-65, its estimate of demand for the same period ranging between 230 and 250 million tons.

I can claim no more, and probably much less, ability to probe the future than the very able persons who drew up these documents. But surely there is another side of the argument. Is it not possible that these estimates of future demand may prove to have been exaggerated and that the N.C.B. may be wise to think in terms of modest contraction rather than further expansion in the not too distant future? The *Plan for Coal* is not of course a rigid and inflexible document and some account may already have been taken of the arguments to which I shall draw attention.[3] But only a limited

[1] A paper read to the Liverpool Economic and Statistical Society on Wednesday, November 10th, 1954.

[2] Report on National Policy for the use of Fuel and Power resources, Cmd. 8647, 1952.

[3] A few sentences in Mr. E. H. Browne's lecture to the Royal Society of Arts in June 1953 suggest that he is very much aware of the need for caution. Also, it is difficult to detect any enthusiasm in the N.C.B.'s reported response to the announcement (made in late August 1954) that a new coal-fired generating station is to be built in Northumberland which will ultimately use about 3 million tons of coal a year.

amount of flexibility is possible in view of the nature of mining operations, the time needed for planning, sinking and bringing into production modern large pits (about ten years), and the enormous capital costs (up to £14 million a time) involved. So it seems better to say these things now rather than later, even at the risk of being confounded by the out-turn of events.

II

Taking the demand side first, there are a number of general points which may be worth making.

(1) Demand in future will depend partly upon price. It is usual (and I have done the same thing myself) to say that the inland demand for coal is very inelastic and that estimates can therefore be made without too much regard to the price factor. But for reasons which are well known, and as is carefully stressed by the Ridley Committee, short run expansion of production can only be secured at sharply rising costs. The Ridley Committee appear to have taken no account of the possibility that the consequent rise in price might choke off some of the anticipated rise in demand if only by drastically reducing the competitive cost advantage which coal at present enjoys over alternative sources of power such as oil.

(2) The difference between shortage and surplus is often very slight. A very small shortage of coal produces such severe and widespread symptoms as to lead us to exaggerate the amount necessary to meet demand.

(3) Estimates of future demand have undoubtedly been influenced by recent experience of rising consumption, lagging production and consequent shortages. In guessing at the future it seems natural to project forward recent experience — we all do it. What is happening now largely governs our plans for the future and it would be foolish to ignore the present which in one way or another may provide the only clues we have. But does not experience often seem to teach that when something has been going on for a long time the possibility of change must increase?

(4) Estimating future demand has naturally depended a great deal on estimates of requirements made by important classes of consumer. It seems probable that they would find it difficult to resist the temptation to make more certain of their future supplies by exaggerating their future requirements. This is not to accuse them of bad faith. It is the sensible thing to do. They are asked to guess and their guess is naturally on the top side of probability since they put themselves so completely in the wrong and multiply their future problems by under-estimating.

(5) Most estimates assume implicitly or explicitly the continuance of a very high level of employment. I have no quarrel with this. Something has to be assumed under this head and this is surely the most generally acceptable assumption to make. But it remains an assumption in spite of an increasing tendency to forget it. I mention it here, however, only by way of further illustration of my point that these estimates are inherently biased upwards. The Ridley Committee take what they call an average year — neither boom nor slump — but their detailed assumptions suggest something more than this. Demand estimates for iron and steel and 'other' industry (accounting for about a half of inland consumption of solid fuel) are based on an assumption of an increase in production by these industries of 4 per cent per annum cumulatively over the next decade.[4] The O.E.E.C. estimates of European demand referred to below in connection with British exporting prospects are based on an assumed 25 per cent increase in total production between 1952 and 1956.

(6) One cannot fail to be impressed by what the scientists tell us about the possibilities of further economies in the use of coal and the rate at which progress is being made in some industries.[5] All estimates make some allowance for this. The Ridley Committee, for example, estimate that in industry generally fuel efficiency will increase at about 1 per cent per annum. How reasonable this is one cannot say but if the scope for increased efficiency is as great as we have been told it would not seem unreasonable to expect more. But it must be recognized that to the extent that this happens the competitive position of coal will be strengthened — and part at any rate of my argument is weakened!

These are the general points. Their cumulative effect is I believe to induce very great caution in accepting the Ridley estimates and even the more modest N.C.B. figures. Now let us look at current consumption trends.

The weekly average figures for inland consumption of coal in Great Britain[6] arranged as index numbers (1949=100) run as follows over the past five years.

1949	=	100
1950	=	103.5
1951	=	107.1
1952	=	106.6
1953	=	106.8

[4] The Committee very fairly point out the considerable difference made to their estimates by only a slight change in this assumption.

[5] The electricity industry alone is estimated to have saved 1 million tons of coal by increased generating efficiency in 1953.

[6] *Monthly Digest of Statistics.*

I should not myself pin much faith to any guesses at the future based on such figures. For what they are worth they suggest, to put it mildly, a marked flattening out of the rate of increase in consumption. Figures for 1954 so far to hand suggest that the rise has been resumed but to what extent it is impossible to tell as yet.

The following series shows how inland consumption is distributed over the main categories of consumer. The figures relate to 1953 and have been abstracted from the last annual report of the N.C.B.:

Consumer	*million tons*
Gas	27.2
Electricity	36.7
Railways	13.8
Coke Ovens	25.9
Iron and Steel	7.4
Engineering and other metal trades	3.8
Other industries	32.6
Miners' Coal	5.1
House Coal	29.6
Anthracite and Boiler Fuel	2.1
Collieries	9.7
Miscellaneous	14.6
Total	208.5

It seems to be generally accepted that the direct demands for coal of the railways, the collieries and possibly the iron and steel industry[1] will continue to decline for a variety of reasons — the most important of which are increasing efficiency in the use of coal and the attractions of other sources of power. Miners' coal is also likely to diminish but this is not an important item. It is difficult to do anything but guess about 'other industries' and 'miscellaneous consumers'. It is highly probable that the use of power in British industry will steadily increase and it is certainly very desirable that it should do so. But it appears highly improbable that this group will increase its direct use of coal — because of the abounding opportunities for fuel economy and the attractions of electricity and oil. Even the Ridley Committee allow for a slight decrease in direct use of coal by general industrial consumers. As regards House Coal there seems to be general agreement that there is a considerable excess demand repressed by rationing. This was variously estimated by experts to the Ridley Committee at anything between 2 and 10 million tons. If we disregard recurrent shortages which always appear with sudden spells of bad weather there is little evidence for this repressed demand. The chances are that there would be little increase in demand per annum if rationing were abolished. Moreover it seems

[1] The Ridley Committee estimate an increase of about 1 million tons between 1951 and the period 1959-63.

more than likely that coal will be used in the domestic grate with greater efficiency in future and that coal will give way increasingly before gas and electricity in the home. The Ridley Committee show a slight reduction in the direct domestic use of coal between 1952 and 1959-63 (assuming a present repressed demand of 5 million tons) but it is difficult to believe that the reduction will not in fact be substantial.

It follows that the increased demand for coal will have to come from the coke ovens, gas and electricity industries and will have to over-balance substantially reductions in the categories previously discussed. The output of coke is certain to increase with the expansion in steel output but there are many opinions about the likely rate of this expansion. This is perhaps the most uncertain factor in the whole equation. About gas and electricity there is more to be said. The consumption of coal at gas works has shown little appreciable change since 1951. Taking account of recent trends in increased efficiency in the use of coal and the considerable efforts now being made to increase the supply of gas from other sources it would not be wise to count on much increased use of coal in this quarter.

Electricity, however, accounts for the greater part of the expected increase in demand and it is at this point that I feel the greatest doubts. The rate of expansion in coal consumption by the electricity supply industry has slackened in recent years, but expansion continues. In 1953 the industry used 37 million tons of coal and it may be about 39 million tons this year. The *Plan for Coal* expected 40 million tons by 1955, perhaps 45 million tons by 1960, increasing probably to 60 million tons by 1975.[a] So far these estimates have been borne out and will probably be borne out in the immediate future. The more distant future is another matter. The use of oil is increasing though it is still unimportant. The economic advantage in electricity generation still rests substantially with coal but signs are not lacking that it may diminish.[b] There are, however, technical difficulties about the use of oil which may be costly to overcome. Then there are the possibilities of nuclear power to be reckoned with. The Minister of Fuel and Power said in July this year that before 1960 'design and it may be construction of nuclear power stations of an advanced type may be undertaken'. The British Electricity Authority

[a] B.E.A. now estimate their coal and coke requirements for 1955 at 42 million tons and for 1960 at 50 million tons.

[b] The new Marchwood power station at Southampton has been offered oil by the Esso Petroleum Co. at a price which will make the cost of generation the same as if coal were used. One swallow does not make a summer but possibilities of a substantial oil surplus are bound to increase the interest of the oil companies in this potential market. It is reported that the British Electricity Authority will almost certainly introduce dual-firing equipment into many new power stations if the oil companies make an attractive offer.

has expressed the hope 'that it will be possible within the next few years to build a large power station employing generating units each with a capacity of up to 60,000 Kw. and using nuclear fission as the source of energy'.[10] Only a year or two ago these developments were being dismissed as idle dreams of the future. Experience suggests that these things always happen more quickly than they are expected to, especially in fields having defence potentialities. Relative costs are anybody's guess. In a Report prepared by the Shell Petroleum Company[11] the lowest estimate of the total cost of 'atomic electricity' is given as about 20 per cent below that of conventional electricity and the highest estimate is about 30 per cent above. 'Even if it be assumed that the highest estimate is the more likely in the U.K., at the present time it seems reasonable to expect that the gap between conventional and atomic prices will have been reduced and perhaps even eliminated during the next decade.'[12] In its own cautious appraisal of the situation B.E.A. states that present information 'indicates that electricity produced from nuclear fuel may in the long term, be competitive with electricity from coal'[13] and that 'there is good reason to believe that a significant contribution to the nation's power supplies will become available from nuclear stations within the next twenty years'.[14]

I want to make it quite clear that I do not doubt that electricity supplies will continue to expand very substantially and that coal will provide the main basis for that expansion for some years ahead. In ten years' time, however, the outlook may be very different. There can be no doubt that the B.E.A. are very concerned about the future prospects of the supply, quality and cost of the coal they need, and are pressing forward the investigation and use of alternatives with the utmost vigour. As against this, however, it must be said that generally speaking the sort of coals currently used by electricity stations are those the output of which can be expanded most quickly and cheaply.

[10] *Power and Prosperity* (1954), p. 61.

[11] *Power and the Atom.* See also 'Some Remarks on Nuclear Power Economics' by Bram de Boer and M. Bogaardt in the August 1954 issue of the *Journal of Industrial Economics.* The authors appear to put the cost possibilities of nuclear energy at between 16 per cent below the cost of coal-generated energy and 120 per cent above. Considerable emphasis is laid on the possibilities of reducing the cost of nuclear energy.

[12] *Power and the Atom,* p. 10.

[13] *Power and Prosperity,* p. 61.

[14] Ibid., p. 62. In one official publication, *Britain's Atomic Factories,* the possibility is envisaged that electricity equivalent to a coal consumption of 20 million tons will be generated from nuclear power within the next twenty years. On September 27th, 1954, Sir John Cockraft stated that this could easily be achieved between 1965 and 1970 – perhaps earlier if the need was great. This is equal to the increase in coal consumption expected by B.E.A. between 1955 and 1975 at the time when the *Plan for Coal* was drawn up! The Director of Research and Development of the Atomic Research Authority has estimated that atomic energy in ten years' time is not likely to be in a position to replace more than a million tons of coal (*Manchester Guardian,* September 16th, 1954).

III

Estimates of future export demand are even more difficult to assess for obvious reasons. The Ridley Committee accepts the estimate of the *Plan for Coal* at 25 to 35 million tons in the period 1961-65. This compares with 16.6 million tons in 1953 but present trends give little guide since it seems to be agreed that more could have been sold if coal of the right quality had been available at present prices. But it seems improbable that in ten years' time the British coal industry will be able to sell abroad something like 30 million tons. I can only register here the more important reasons for this belief.

(1) The demand for foreign bunkers will continue to decline as more ships change to oil.

(2) Approximately half of our current exports are of high quality special coals such as anthracite, gas coal and large steam coal. The output of these coals can only be expanded with great difficulty and at very high cost.

(3) Optimistic estimates of future prospects of British coal exports were a great deal influenced by the competitive advantage which British coal enjoyed in European markets after the war — estimated in 1949 to be about £1 per ton on the average. In 1953 the average price of coal exported seems to have been about 75s. per ton compared with average proceeds per ton for all coal produced of 65s. per ton. Since the former contained a relatively much higher proportion of expensive coals this competitive margin must now be much diminished.[14]

(4) Other expert appraisals and present market indications do not support the optimism of the N.C.B. An appreciation by a prominent exporter (privately circulated 1949) of British prospects in markets taking 74 per cent of our coal exports suggests that the solid fuel requirements of these countries will drop from 64.7 million tons in 1938 to an estimated 51 million tons in the period 1952-59. In a report by O.E.E.C.[15] in 1952 it was estimated that O.E.E.C. countries (including the U.K.) in order to achieve a 25 per cent increase in production of all goods would need to expand coal consumption by 61 million tons between 1951 and 1956 whilst production should increase by 64 million tons. These estimates include an expected increase in British production of 13 million tons but the expected increase in British consumption is not shown. It could hardly have been less than 13 million tons. This report was of course dominated by an assumed 25 per cent in over-all production but for what it is

[14] This is not to deny of course that for particular coals it may still be more than £1 per ton. The export price of Durham best gas seems to have been about 23s. per ton above the inland price early this year (*Econ. Bull. for Europe*, 1st quarter, 1954, p. 98).

[15] *Coal and European Expansion*, 1952.

worth it suggests that in O.E.E.C. countries (apart from the U.K.) the expansion of production was likely to exceed the expansion of consumption. These countries at present take a very high proportion of total British coal exports.

It is difficult to get reliable figures (corrected for stock changes) for the present trend of consumption in Europe. Figures of apparent consumption of hard coal in Western Europe (excluding the U.K.) published by the United Nations suggest stability or even slight decline since 1951. The production figures show a similar pattern. The general picture in the spring of 1954 was that of production being held back by insufficient demand and the accumulation of stocks at the pit head. 'In virtually no country did energy bottlenecks provide any obstacle to the recovery of production. Indeed such difficulties as arose in the field of energy supply were the product of too little rather than too much demand. This is particularly evident in the case of coal.'[17]

(5) The appearance of the United States as a formidable competitor in many of our traditional markets and the existence of the European Coal and Steel Community do not augur well for the future of British exports.

IV

The foregoing does not purport to be a comprehensive examination of the future demand for British coal. Rather it is an attempt to call attention to some points which should be borne in mind before accepting current estimates. They seem to contain a persistent 'inflationary' bias and may well prove to have erred seriously on the side of optimism. The position may be summarized as follows.

(1) Predictions of a very rapid expansion of inland demand are based on a very narrow range of consumption groups, the most important of which will soon be rapidly developing the use of an alternative source of power. Elsewhere the picture is one of contraction in the direct use of coal. Current exports are not a good guide to real overseas demand, but they are well below the 1949 level[18] and the prospects of reaching the target set in the *Plan for Coal* for 1961 to 1965 are not good even if supplies are available.

(2) The usual assumption that coal must be made available to meet the estimated requirements of users at almost any price or else irreparable harm will be done to the British economy should be taken with reserve. It is probably true in the very short run, but alternatives are available in many important uses. Short run

[17] *Economic Survey of Europe in 1953*, United Nations (1954), p. 5.
[18] The initial year of the *Plan for Coal*.

expansion of coal supplies will be very expensive, and if demand in ten years is likely to flatten out and even decline it may be economic to encourage the use of alternatives at slightly higher cost in the present.

(3) Cost and price considerations may be vital to the coal industry in ten years' time if it is to avoid a seriously weakened competitive position at home and abroad and a rapid decline in its present position and importance in the British economy. This is another reason why expansion of output should be proceeded with cautiously. Indeed, one can only feel happy about the N.C.B.'s target output of 240 million tons of coal in 1961-65 if the expectations of the *Plan for Coal* about rising productivity and cost reduction are realized.

V

Turning more briefly to the supply side. Any detailed examination is obviously out of the question here but attention should be called to several factors, well enough known to students of mining economics, which have a significant bearing on the foregoing.

Coal is of many different qualities, and whilst adaptable in greater or less degree to many different uses, is subject to different degrees of substitutability in use.[19] All coals even of similar 'qualities' are mined in different places and at different levels of cost. For physical and technical reasons it is often impossible to equalize costs (average or marginal) of any grade by expanding production at low cost pits, though in the long run relative pit costs will indicate the most economical lines of future development. But coals of the same quality must necessarily be sold at the same price in the same market. If the industry is 'breaking even', as it strives to do, some pits, producing predominantly the same class of coals, will necessarily be making profits and others losses. Where, as commonly happens, the same pit is producing different qualities its profit or loss will depend on a balance of these numerous and possibly conflicting considerations.

If pits are arranged in order of profitability some surprising results are achieved. Sir H. Houldsworth told the Manchester Statistical Society (February 11th, 1953) that the 200 'worst' pits in 1951 produced 24 million tons of coal at an aggregate loss of £18 million. This group produced about 60 per cent of the national output of anthracite and about 30 per cent of the special coking coals — about 3 million tons of each would be my guess.[20] Mr. E. H. Browne told the N.C.B. Summer School at Oxford (September 13th, 1954) that in 1953 the most unprofitable 30 million tons made an aggregate loss

[19] Even the use of the word quality is an over-simplication. There is no straightforward criterion of quality of coal.

[20] About 18 million tons were general coals. Of the 24 million tons in question about two-thirds were mined in South Wales, Durham and Scotland.

of £25½ million. Of this 30 million tons, 10 million were got at an aggregate loss of £14.2 million. To put the point more crudely, the elimination of the least profitable 30 million tons would enable the average price of coal to be reduced by 2s. 9d. per ton, and the elimination of the least profitable 10 million tons would permit a reduction of 1s. 6d. per ton — all other things remaining equal. I am not of course suggesting that anything so foolish and so arbitrary should be done. Some of the pits were unprofitable for temporary and special reasons, others are probably permanently unprofitable and kept in production only to keep up the supply of coal. Also there is a case to be considered for maintaining the output of special high quality coals such as anthracite and Durham coking coals, though I believe it may have been exaggerated and merits periodic re-examination.

These figures emphasize the high cost of raising the short-term output targets of the N.C.B. Marginal units will need to be kept in production in spite of increasing unprofitability. This will do much to offset the cost economies expected within the next ten years from the technical reconstruction programme of the Board. The position might easily develop of the industry facing simultaneously a sagging demand, excess output capacity, and a much higher level of costs and prices than it had anticipated. This in its turn, as I have previously suggested, may accelerate the substitution of other sources of energy for coal.

Secondly, it is often argued that the existence of high cost marginal units gives the necessary flexibility to the output expansion programme. If the need for coal does not rise very steeply they can be retired from production more quickly than had been planned as new large units and reconstructed pits come into full production. And vice versa. But it is not quite as simple as this. Strong pressure will undoubtedly be brought to bear to prevent a sudden closure of a large number of pits to meet an adverse change in market conditions (which may manifest itself quite sharply) since these pits are concentrated in a few areas. If they are not closed the maximum use will not be made of the new and reconstructed pits. If coal needs do expand then we must not blind ourselves to the difficulty and cost of meeting these needs. Many of the so-called marginal pits are nearing the end of their useful lives unless expensive schemes of reconstruction are put in hand. There will still be a case for vetting these demands very carefully and encouraging the use of alternatives where available.

Thirdly, the history of the coal industry in the twentieth century suggests that the real cost of coal getting will steadily rise in future

and that the best efforts of the technicians are not likely to do more than slow down the process. The competitive advantages which coal at present enjoys will probably steadily diminish. If, in this sense and in the long run, coal is to become a declining industry, is it not common sense to plan accordingly? That is, to think of the industry as being somewhat smaller than most people seem to want it, more compact and technically efficient, better able to assure its workers of steady employment at a high standard of living, and better able to face future competition. On such terms the adjustment of the industry to future change could proceed more slowly and smoothly than otherwise might be possible.

VI

In summing up I want to make one thing clear. I do not deny the wisdom of present N.C.B. policy, much less suggest any radical revision. I have the greatest admiration for the Coal Board planners and I think that in spite of all the criticism lavished upon them they have done a first-rate job. What I am suggesting is rather a subtle change of stress. In short, that they should view with some suspicion the arguments of the expansionists and not be too easily diverted from their long-term objectives. That is to say, they should press on with the orderly retirement from production of marginal units, speed up technical reorganization, and encourage the expansion of low cost production areas by all means available. In any re-examination of the *Plan for Coal* I would be happier to see the output targets revised in a downward rather than an upward direction. I certainly cannot bring myself to believe in the wisdom of planning for an output of 262 million tons within the next eight years or so by which time the Board may be faced with a different situation and one with which, as a direct consequence, they will find it difficult to cope.

It will doubtless be complained that my own argument is one-sided. This is freely admitted. My defence is that I have sought to show in a short space that there is another side of the medal and not to forecast in detail what the future holds. I would not say too confidently that within the next decade the demand for British coal will start to decline. I do say that such a possibility is sufficiently real for it to be constantly borne in mind by those who plan the future of the industry.

Many qualifications need to be made. I shall mention only three because in some minds they may over-bear my argument. The first is that strategy must dominate economics and coal is our only important indigenous source of energy. The second is that social diseconomies outweigh the economic merits of closing marginal units

and allowing high cost coal-producing areas to decline. Thirdly, that coal is a wasting asset and that accessible reserves should be fully worked out before abandonment of pits.

To comment on these would require another paper and on some of them the economist has no particular right to be heard. I have mentioned them for the sake of completeness and also because if N.C.B. policy is to be dominated by what are in the main non-economic arguments it should be stated explicitly by direction of the Minister. Otherwise the Board exposes itself to much contradictory criticism which, however much they profess to ignore it, must cloud argument and affect sound planning for the future.

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SOME ASPECTS OF EUROPEAN MONOPOLY LEGISLATION[1]

by ARTHUR L. PLEASE

THE concentration of economic power in private hands raises in the sphere of government complex social and political problems which since the war especially have been the subject of much study. Indeed, since 1945 the control of monopolies and restrictive business practices has been the subject of legislation or proposed legislation in nearly all the principal industrial nations in Western Europe. The virtually universal trend towards the concentration of economic power in fewer and larger units, for technological and financial reasons, has meant an inevitable tendency towards monopoly or oligopoly in the relatively small European economies. The economic instability of the nineteen-thirties also accelerated the trend towards the association of firms within particular industries for their mutual assistance and protection.

There has never been in Europe anything approaching the strict American anti-cartel philosophy embodied in the Sherman Act. It would probably be a mistake to speak of a European view. But there are few instances in European legislation where particular practices are barred outright, while in some cases they may be actively fostered by the State. The European approach remains broadly an empirical one, based on the thesis that restraints on competition are not necessarily evil in themselves and may in many circumstances yield benefits more than commensurate with their cost to the community.

The Present Position in the United Kingdom

The United Kingdom itself is still, as it were, in process of evolving a philosophy which would guide the rational control of what, for want of a better title, are usually known by the cumbrous phrase 'monopolies and restrictive business practices'. Until the passage of the Monopolies Act in 1948, there had been no attempt to control such practices by statute. In the courts, the common law doctrine broadly held good that contracts in restraint of trade were in general void as conducing towards monopoly and being in consequence at variance with public policy. Over the last fifty years, however, judicial interpretation had considerably modified this simple rule,

[1] This paper was prepared on the invitation of *The Journal of Industrial Economics* in view of the interest of its subject for contemporary discussion. No comments therein, or inferences therefrom, may be taken as representing or incorporating the views of any business or organization with which the author is connected.

and broadly speaking, if the parties to a contract could show that the restraints in question were reasonable, both from their point of view and from that of the public, then the contract had a good chance of being upheld.

The Monopolies Act marked a radical change in making provision for the investigation and control of restrictive practices. But even this measure did not represent any fundamental alteration in attitude towards agreements in restraint of trade. It was based on the view taken in the White Paper on Employment Policy issued in 1944 by the Coalition Government that 'such agreements do not necessarily operate against the public interest but the power to do so is there'.

The system of control established by the Monopolies Act is in many ways an odd one. Under the Act there was set up a Monopolies Commission. It may be required by the Board of Trade to investigate whether in any industry monopolistic conditions exist within the meaning of the Act and, if requested to do so, to comment on their effect on the public interest. The Commission as such has no powers of initiation and its functions cease with the making of its report.

Where the Commission has been asked to report on the public interest and has indicated that certain practices operate against it (or where the House of Commons has passed a resolution to that effect) Ministers are empowered to issue orders prohibiting the practices concerned. It is notable that even then breach of the order incurs no criminal liability: either the Crown or any person affected has recourse to relief through the civil courts.

The system thus established clearly derives from long standing British practices in two particulars especially: the regulation of business practices remains a matter for civil not criminal jurisdiction; and the ultimate criterion is the public interest. Nevertheless the operations of the Commission over the past five years have proved it by no means an ideal instrument of control.

The work of the Commission has proceeded extremely slowly. Since the passing of the Act only eight investigations have been completed, and inquiries have frequently taken some two or more years to complete. In part this has been due to the meticulous care with which the Commission has conducted its inquiries, and its thoroughness and impartiality have been established beyond question. But even though the recent reforms made in the composition of the Commission may be expected to improve its rate of progress, clearly the machinery as at present constituted is too cumbersome. Moreover, there is the difficulty that as a result of an inquiry a

particular section of industry may be censured for the operation of practices which may be widespread throughout the economy. This in fact happened in the case of the first industry to be investigated — the Dental Goods Industry, against which an order was made prohibiting exclusive dealing and collective boycott.

These are fundamental difficulties and the recent reforms though welcome are hardly calculated to go to the heart of the matter.

It is not surprising therefore that in some quarters there are many advocates for the abolition or modification of the present system and for the introduction of a measure of general legislation of a regulatory rather than a supervisory nature. The Monopolies Commission has in fact had referred to it a general inquiry under Section 15 of the Act into the general effect on the public interest of the practices of 'exclusive dealing' and 'collective boycott' on which a great many restrictive agreements are based.

The introduction of general legislation would, however, raise a number of new problems. It could not but contravene the hitherto accepted principle that the exercise of restrictive powers is not inherently harmful, and that each case should be judged individually for its practical effects rather than its potential abuses. The differing circumstances of individual industries render it probable that some exceptions would have to be admitted to any general prohibition. It would, however, be difficult to provide legislatively for these exceptions without increasing the burden of administration and without occasioning uncertainty in industry about the continued validity of particular arrangements.

Monopoly Legislation in Europe

Comparison of the British system of monopoly control with the various measures adopted by Continental legislatures reveals many interesting differences both of method and of principle. There have been frequent suggestions from time to time that various Continental devices might indeed be incorporated in our own legislation with beneficial results. This is not a matter for hasty judgment, however, and the success of a particular institution abroad does not necessarily mean that it would automatically succeed here. Each country's laws must be viewed in relation to its economic development, its political temper, and the habits, customs and traditions of its people. It is for precisely this reason that the various regulatory devices and procedures adopted in Europe do not readily fall into well-defined systems of classification. Most commonly, legislation is framed in one or two ways. The first is to permit in general the existence of monopolistic institutions and

restrictive practices, with safeguards against abuse. This is the most common approach, to which British law broadly conforms. The second is to forbid them in general with permissive exceptions to meet particular circumstances. These two systems are not necessarily exclusive.

Within these general principles the details of the various systems in force vary widely. It is obviously impossible, and would indeed be tedious, to attempt to describe in the space available even in summary form the particular institutions of each country.[1] All that can be done is to try to illustrate the general tenor of some of the interesting attempts which have been made to deal with the problems involved.

Of the various regulatory devices adopted on the Continent that of the registration of business agreements is the most outstanding. Many countries have adopted, as part of their methods of monopoly control, legislation requiring commercial enterprises and trade associations to file, for incorporation in an official register, data relating to agreements, understandings and decisions involving certain restrictive practices.

Among the countries where registration procedures exist are Austria, Denmark, Norway, Sweden and the Netherlands.

Registration serves first as a means whereby information regarding industrial agreements may be made available to the responsible controlling authority, and, where the register is published, to the public.

The powers of the controlling authorities naturally vary from country to country. In some cases only by registration can an industrial agreement acquire legal validity, so that refusal of registration is a bar to the operation of an agreement. In virtually every case the registration authority has in some degree the right to promote further investigations into the nature, extent and probable effects of any agreement and to require the modification or discontinuance of offending provisions.

Registration is, in fact, not a substitute for control but an aid to it. The degree of toleration towards restrictive practices exhibited by the various countries which have adopted registration procedures has varied considerably. The tendency of post-war legislation in the countries concerned has in general been towards more severe control.

The Netherlands

Supervision by the Netherlands Government of monopolies and

[1] For further information see Report of the *Ad Hoc* Committee on Restrictive Business Practices to the Economic and Social Council, United Nations, 1953.

restrictive business practices dates back to 1935. Under the Business Agreements Act of that year all agreements had to be deposited in writing with the Department of Commerce. The Act provided that agreements so deposited should remain secret.

Secondly, an advisory Committee, called the Commission for Business Agreements, has been set up to advise the Government on applications for the grant of 'binding force' or 'non-binding force' to any agreement registered. If 'binding force' is accorded to an agreement, it means that an agreement between a number of undertakings in a particular trade is made binding on all persons and undertakings throughout the specified trade, whether parties to the agreement or not. If 'non-binding force' is granted it means that, while the agreement is neither approved of nor objected to, the agreement is limited to those undertakings in the trade covered by the agreement, and may not be used in such a manner as to discriminate against non-parties engaged in that trade, or imposed upon them.

The Minister of Commerce, on the advice of the Commission for Business Agreements, may suspend wholly or in part any business agreement.

Before the last war the main emphasis lay on the alleviation of cut-throat competition, by the granting by Ministerial decree of 'binding force' to agreements, on application by the parties concerned. No such decrees have been made since the war. But since the war there has been a considerable increase in the number of applications to render agreements 'non-binding'. Here the usual procedure is for an injured party to complain to the Ministry of Economic Affairs. The matter is then referred to the Committee for Business Agreements. The Committee is free to fix its own procedure. Normally it holds hearings at which both plaintiffs and defendants are represented. After considering the facts it reports in confidence to the Minister who bases his decision on its findings though he is not bound to act upon them.

The Committee may find that the public interest is not being infringed, in which case no action usually results. It may recommend that the whole or part of any agreement should be decreed 'non-binding' or may suggest that it be decreed 'non-binding' unless it is modified in certain respects. In a buyer's market such as exists at present the issue of a 'non-binding' decree normally means the collapse of an agreement since it is no longer generally enforceable. The parties of the agreement may, however, seek to negotiate its modification with officials of the Ministry of Economic Affairs in an attempt to remove the undesirable features.

Since the war the absence of cut-throat competition and the rapid rise in prices resulted in a certain hardening of public opinion against restrictive practices, but this has to some degree been lessened of late by the return to a buyer's market. The projected legislation now before the Dutch Parliament is in consequence largely in the nature of a consolidating Bill. In accordance with usual Dutch practice a draft Bill was circulated earlier in the year for the comments of industry and the public and the new measure reflects to some extent the expression of public opinion this elicited.

The main differences compared with existing legislation are:

(i) The Government will now have power to take action against abuses of monopoly power by a single enterprise.

(ii) The Government will have power to declare certain practices generally non-binding after consultation with the Committee of Business Agreements.

The new Dutch legislation must be viewed in conjunction with the measures which have been taken under the Organization of Industry Act which provided for the institution of commodity boards and industrial boards which it is intended shall exercise as part of their functions certain regulatory powers over economic competition. Both enactments take for granted a system of production and distribution run by private enterprise and seek to allow the greatest possible freedom to the undertaking consonant with its responsibility to the community. It is expected that as the public organization of industry develops the regulation of business practices will devolve to an increasing extent on the industrial boards and that their work will render the device of declaring agreements 'generally binding' increasingly superfluous.

Since the declaration of 'non-binding' force can be applied only to formal agreements, there is the further important provision that the Government should have power to issue regulations to remedy situations where a declaration of 'non-binding' force would have no effect. Thus it is envisaged that the Government would be empowered to issue regulations regarding the line of conduct which must be followed by undertakings or groups, for example, to counteract undesirable situations brought about through the operation of 'gentlemen's agreements' or to regulate the methods of fixing prices or terms of sale by undertakings exercising a dominant position in a particular market.

The system of regulation thus outlined betrays many fundamental differences in principle from that in force in this country. In

particular there is a much greater disposition to accept the existence of industrial ententes as established and frequently beneficial institutions and to attempt to integrate them into a logical system of production and distribution. At the same time the proposed structure of control is associated with a far higher degree of state-sponsored if not state-run supervision than many would regard tolerable in the United Kingdom.

Sweden

A different approach to the question of monopoly control may be seen in the system at present in force in Sweden. Here, again, is an example of a country with a small population and limited markets where the tendency towards monopoly inherent in modern large-scale techniques of production is marked. The essential features of the Swedish system consist in the registration of business agreements together with provision for investigation and control by Government agencies. The system is, however, noteworthy for two features, namely the degree to which public opinion is enlisted as an intangible but none the less powerful adjunct to control through the medium of publicity, and the degree to which the authorities have secured the support of private enterprise acting through its own organizations in regulating restrictive practices.

Supervision by the Swedish Government of the activities of cartels and so-called restrictive business practices dates back to 1925. In that year a law was enacted under which the Swedish authorities could, under certain conditions, institute investigations into restrictive business practices arrangements, monopolistic enterprises and combines, though few investigations were in fact undertaken. The provisions of this enactment continued until 1946 when a new Act was passed to enable permanent supervision of monopolies and their activities together with the registration of business agreements. The 1946 law provided for the registration with the Cartel Office of the Board of Trade of agreements tending to restrict competition, affecting prices, production, distribution or transport in Sweden. Registration is, however, not automatic but is compulsory on demand. At the same time there was set up a Monopoly Investigation Office charged with the responsibility of scrutinizing agreements which have been registered, to see whether they might be harmful to the public interest. In cases where any agreement appears likely to have harmful effects, the Monopoly Investigation Office may undertake a 'special investigation', and subsequently report to the Government. In selecting the agreements for 'special investigation', the Office acts on its own discretion.

The powers of the Monopoly Investigation Office are far reaching. It can order single firms or organizations to supply all available accounts, correspondence, minutes of meetings including directors' meetings, etc. Similarly Associations and individuals other than the actual parties to the agreements can be ordered to furnish information which may be relevant to the case.

The Monopoly Investigation Office has, however, no executive authority, and consequently cannot institute action against any practice or agreement which it may decide is harmful to the public interest. The Swedish Government and Riksdag have reserved the right to themselves both to appraise the findings of such 'special investigations' and to decide upon such remedial action, if any, as seems required in the light of the circumstances revealed in the reports. Action can take any of the following forms: (1) The Government can appoint a commission with power to negotiate with the parties concerned so as to bring about the abandonment of the agreement, or its modification so far as its harmful features are concerned; (2) the Government may take steps to encourage imports of the goods concerned in order to stimulate competition in the Swedish market; (3) a further possibility is the creation of state-owned enterprises for the goods in question or the nationalization of existing enterprises.

In view of the boom conditions which have prevailed since the war, the activities of the Monopoly Investigation Office have not been as extensive as was contemplated at the time it was set up.

A plan is, however, under consideration to extend the scope of the Monopoly Investigation Office by the creation of a third department whose principal function would be to carry out a continuous study of the price structures in industry with the especial purpose of deciding whether, and in what direction, monopoly agreements have resulted in a condition of rigidity in price policy.

The provisions of the 1946 Act were supplemented by the passage of a further Act last year. The main features of this Act were to set up a Freedom of Commerce Board similar in composition (though not in functions) to the British Monopolies Commission. This Board has two main functions. The first consists in the negotiation with the parties concerned of the abandonment or modification of any agreement which may have harmful effects. Secondly, the new Act specifically prohibits resale price maintenance and collusive tendering for contracts except by permission of the Board.

Initiatory powers in these matters rest normally with a newly created officer known as the Commissioner for Freedom of Commerce who is a qualified lawyer with judicial experience, though it is open for

any person affected by a restrictive practice to request negotiations. The Commissioner is heard before the Board during the course of any negotiations and both the Board and the Commissioner may call on the Monopoly Investigation Office for assistance.

The system thus described presents a much more complete separation of powers than is commonly found. The administrative provisions of the new Act came into force on January 1st, 1954, and the clauses prohibiting resale price maintenance and collusive tendering only on July 1st, so that it is as yet too early to say how it will work out. There is, however, one aspect of the Swedish system which is of special interest.

The public registration of business agreements in Sweden has led in great measure to the voluntary reconsideration of the terms of existing agreements by industry itself. On the one hand industry has become much more conscious of public feeling about the less desirable aspects of industrial ententes, on the other there has been a growing sense of the need for greater publicity regarding industrial agreements as a whole, so that the public at large may be better informed of their nature and of their value to the economic welfare of the community.

One result of this change of attitude was the appointment in 1950 by the Federation of Swedish Industries of a Cartel Committee to offer advice and assistance in the reconsideration of business agreements. A Cartel Office was also established, the aims of which were to provide a more permanent platform for publicizing the efforts of parties to agreements, to lead to a reduction in the number of restrictive agreements in operation and to secure modifications in the restrictive provisions of such agreements as continued.

In general, these organizations have recommended the dissolution of agreements which were inoperative or of little practical use. They have also recommended dissolution of agreements concerning such matters as the division of markets, price fixing restrictions on entry, exclusive dealing and other discriminatory practices. Where it has been impossible to get parties to an agreement to dissolve it, an attempt has been made to secure modification of their less desirable features. The organizations concerned have also afforded consultation concerning the registration of agreements and various aspects of the cartel laws as well as promoting publicity. As a result of these activities something like a third of all agreements registered have been modified or cancelled.

Norway and Denmark

Further variants of systems involving registration may be seen in

Norway and in Denmark. Each of these countries has substantially amended its control legislation since the war. Each has a number of features peculiar to itself.

Norwegian law has required registration of information relating both to the activities of firms exercising a dominant market position and restrictive combinations and agreements since 1926. The present law which came into force at the beginning of this year is more specific in that it requires the filing of reports whenever individual firms or parties to agreements account for a quarter or more of Norwegian trade or production in any commodity or service.

The new system of monopoly control established by the present law is subservient to a much wider system of control over prices and profits. The Price Directorate has extensive powers to carry out the price policy determined by the Government by issuing directives on maximum and minimum prices, discounts, delivery terms, profits and the like. Dividends are subject to statutory limitation except in special circumstances. At the same time it is the Price Directorate which is the register authority with powers to investigate, modify and dissolve agreements as necessary. Under the new law the register is published, whereas formerly it was kept secret save for the issue of an annual summary.

Danish practice, under the law of 1952, contains broadly similar requirements for registration and the information so obtained is published. Here, again, it is the Price Control Board which is the registration and controlling authority, with powers to investigate and where necessary secure modification or dissolution of offending agreements. The Board has, in addition, powers to fix maximum prices and profits where competition is not effective.

Germany

As a complete contrast to the systems outlined above may be instanced the draft legislation at present under discussion in Germany. Despite the Cartel ordinance of 1923 there is no history of any effective control over cartels in Germany. Indeed, a variety of circumstances, geographical, economic, social and latterly political combined to foster their development up to the late war. By contrast the Allied decartelization and deconcentration measures imposed after the war were extremely severe. It is not surprising, therefore, that the present measures proposed by the Federal German Government should be the subject of intense controversy. In contrast to the majority of the countries which have introduced legislation in this connection since the war, the present German Government has rejected the direct supervision of monopolies and

restrictive practices in favour of a system which renders them illegal except in certain circumstances. The permitted exceptions cover a wide range, however. They include the formation of agreements for the promotion of rationalization, for the fixing of export prices, and for the fixing of prices during a temporary recession. Resale price maintenance would be permitted in general though it is envisaged that excessive prices might be declared void. No action would be taken against existing oligopolies, but further mergers which might tend to a concentration of market power in a few hands would be forbidden.

The administration of this legislation would be in the hands of a Federal Cartel Office, which, it is proposed, should be given various discretionary powers such as the granting of permission for the formation of cartels to counter a trade recession.

Conclusions

It remains to offer a few generalizations on the basis of the foregoing brief summary of certain aspects of European cartel legislation, though perhaps the caveat should first be entered that events are still changing rapidly. The first point is one of general principle. Where a concentration of economic power exists a government has two choices. It may seek to circumscribe that power by prohibitory legislation or it may seek to regulate its effects on the community. In the extreme case this implies, on the one hand, total prohibition, on the other complete direction.

Prohibitory legislation, as has been remarked above, is foreign to the British tradition, is awkward to frame and difficult to administer. There is, moreover, an inherent bias in modern industrial systems towards increased concentration.

Prohibitory legislation may be effective in removing certain symptoms of monopoly but it can do little in eradicating the causes. And it is more than possible that to disrupt existing agreements may well increase rather than decrease the degree of monopoly by ultimately encouraging amalgamations. This leaves the central problem of monopoly itself — as apart from restrictive business practices — largely untouched. It is perhaps significant that more than once the Monopolies Commission itself has come to the conclusion that the disruption of an effective monopoly would involve an upheaval out of all proportion to the results obtained, and has recommended in consequence regulation of prices and profits in the industry. If a crude generalization were hazarded on the basis of the admittedly slender evidence provided by the results of the Commission's work so far, the general tendency would seem to be,

in fact, to recommend the dissolution of restrictive agreements and the supervision of monopolies.

With all its failings it is probable that the empirical approach remains the right one. Yet the reference of all problems to the test of the 'public interest' is at once the strength and the weakness of the British Monopolies Act. The criteria embodied in Section 14 are necessarily vague: but to attempt to render them more specific might be to make confusion worse. 'Public interest' is necessarily a fluid and ever changing concept. It is perhaps understandable if the Commission on occasion is obliged to fall back on first principles as it has been widely criticized for doing in a recent report. Possibly the greatest source of difficulty is the tendency to discuss questions of monopoly and restrictive practices solely in terms of economics, for their implications go far wider. It is not perhaps sufficiently recognized that over a large area of both industry and commerce, amongst both management and labour alike, the general body of opinion, nebulous perhaps and half-formed, tends much more towards the medieval concept of the guild and the 'fair price' than towards the classical principles of *laisser-faire* to which authority still leans.

It is many years now since the combination of workmen in defence of their wages and working conditions was put down by law as an unwarrantable infringement of the freedom of trade. If general recognition of the propriety of similar action by entrepreneurs is slower to come, it is because no collective bargain can be struck with consumers in the mass. To insist that the final arbiter shall be the unrestricted play of market forces is anomalous, if only because of the limitations on the freedom of supply and demand which the welfare state already imposes. Yet to many people the alternative of Government supervision is no less suspect as one more step on the road to the corporate state.

The various institutions described above are in effect all attempts to deal with these problems. Each has its own virtues and defects in its own environment. The answers to the basic questions — how much competition, and how to achieve it — vary from country to country, from industry to industry, from decade to decade. If one may express a personal preference it is for indirect rather than direct methods of control, for inducement rather than compulsion. It may well be, in fact, that if we are fortunate enough to continue to enjoy full employment much of the problem may solve itself, partly through the withering away of restrictive agreements framed in a different environment, partly by reason of the stimulus to competitive enterprise afforded by an expanding economy. If we are not so

fortunate, and prolonged depression returns, it is equally likely that the whole attitude of authority and of the public towards restrictive practices might undergo a drastic transformation.

LONDON

THE CONCEPT OF STEEL CAPACITY

by JAMES A. MORRIS

THE subject of steel capacity has many dimensions, which are not always carefully evaluated when matters of public policy arise. Steel producers in Europe and the United States have been subjected to intense criticism in the last few decades, first for creating excess productive capacity and later for being unwilling to expand to meet the needs of steel consumers. In the depression era of the 1930s the American steel industry was charged with creating a pricing system which provided an 'umbrella' to inefficient and obsolete facilities, thereby fostering over-capacity and unemployment. When tremendous demand pressures were exerted on production facilities during the post-war period, steel producers were accused of using their 'monopolistic price policy' to restrain demand and thereby cause unemployment in other industries rather than make the necessary increases in facilities. These allegations were denied, but the charges and denials provide no definitive answer to the question of what constitutes the proper steel productive capacity for the immediate future.[1] The object of this paper is not to provide such an answer but rather to clarify the meaning of steel capacity, thereby providing a basis for analysing the question of how much steel is enough.

Both the economist and the steel manager think of capacity in terms of output potential, but the framework of reference of one is costs while the other is also concerned with technical considerations. For both it is necessary to specify whether the focus of attention is equipment, a firm or the industry, and whether capacity refers to a point of time or a period. Excess capacity, or the difference between the output potential and the output actually demanded, can refer either to an excess of plant and equipment or of all productive factors. A clear-cut distinction must also be made between the maximum output theoretically attainable without regard to costs and the estimated capacity under normal operating conditions. Customarily, the potential for producing ingots is taken as an index of the overall capacity of the iron and steel industry, and the production of ingots relative to rated capacity is one of the basic business indicators in the United States. Such a measure is meaningful since the availability of ingot steel is a limiting factor in the production of steel products and there is a reasonably consistent

[1] See Monograph 42, *The Basing Point Problem*, Temporary National Economic Committee, Washington, 1941. G. D. H. Cole, *Why Nationalize Steel?* New Statesman Pamphlet, London 1948. *America's Steel Capacity*, American Iron and Steel Institute, New York, 1948. J. Harry Jones, *The Steel Industry and Nationalization*, Pitman, London, 1948.

relationship between them. In addition, a comparison of the meaning of steel capacity to the economist and the manager is facilitated because ingot steel is a relatively homogeneous product and is normally produced on continuous schedules.

ECONOMIST'S VIEWPOINT

The economist draws a careful distinction between two production periods: the short-run when the quantity of plant and equipment is taken as given, but the extent of utilization may vary; and the long-run when the productive capacity or plant and equipment can be altered to meet changes in demand or cost conditions. It is not feasible to take any particular period of time, say a month or a year, and term it short-run, since adjustments in the rate of capacity utilization and in the size of capacity tend to occur during the same time periods. Starting from a model of an industry with many sellers and homogeneous products, capacity can be conceived as the output which results when plants are operating where average full costs of production are at a minimum.[1] Using this definition, capacity would vary with the prices of productive factors. Furthermore, even though capacity is defined in short-run terms, operation at the minimum point on the average cost curve may be achieved only under long-run equilibrium conditions.

Taking into consideration the uncertainties of the real world and the imperfect mobility of resources, it is recognized that this tendency toward equilibrium may be distorted. As a matter of fact, because of incalculability there may be either under or over capacity in an industry. When further qualification is added to the concept by recognizing that consumers desire differentiated products, the possibility arises that, if entry into an industry is unimpeded, long-run excess capacity will result. That is, there will be more resources employed in the industry than would be necessary if all firms operated at their minimum average costs.[2] This reasoning to some extent ties in with the previously mentioned ideas about the emergence of excess capacity if restriction of competition permits the maintenance of prices at an artificially high level. Some economists, however, have pointed out that if the firm takes a longer-run view of the demand for its differentiated product it will not exploit its opportunity to make excessive short-run profits and consequently excess capacity need not appear.[4]

[1] J. M. Cassels, 'Excess Capacity and Monopolistic Competition', *Quarterly Journal of Economics*, May 1937.
[2] E. H. Chamberlin, *The Theory of Monopolistic Competition*, Harvard, 1933.
[4] P. W. S. Andrews, *Manufacturing Business*, Chapter III, Macmillan, 1949. R. F. Harrod, 'Theory of Imperfect Competition Revised', *Economic Essays*, Macmillan, 1952.

The type of market situation exemplified by the steel industry in any country, with productive facilities in the hands of comparatively few firms, is that of oligopoly.[5] This situation of relatively few firms competing is a normal industrial fact, and predicates no particular type of behavior. Theory in this sphere is not as clear-cut because the actions of firms are considered to be influenced by estimates of the possible reactions of rivals to price or other adjustments made by them. There may be tacit or open agreement on policy by firms, for example, which might take the form of high prices and profits and the creation of excess capacity if entry into the industry is reasonably easy. As already indicated, it is equally possible that firms will take a longer-run view of their markets and will not exploit their opportunity to make large temporary gains in favor of pricing at a lower and more stable level. In such a situation it can be anticipated that there may be a lesser degree of expansion of facilities in the upswing than under the norm of pure competition, and consequently less purging of unused capacity in the downswing of the cycle. Capacity may still be measured in the same manner as with other types of competition in terms of a point on the average cost curve.

Statistical studies of cost curves of steel producers, undertaken during investigations of the state of competition of the American steel industry, have raised issues relevant to capacity.[6] If marginal cost does tend to be constant for wide ranges of output, this would indicate that the most favored position for the producer, granting that the state of demand permits, is at the point on the marginal cost curve close to the maximum potential output, where costs suddenly rise markedly. These analyses have been limited to the total output of the steel firm concerned, involving a heterogeneous output. Certain methodological questions have also been raised about them, so their pertinency for questions of steel ingot capacity is in doubt. If the tendency to build flexibility into plants is taken into consideration, however, logical justification is provided for constancy of marginal costs. In a plant built so as to make additions to output possible by making alterations at moderate cost, there would tend to be continuous variation in the marginal cost curve from the short run to long-run equilibrium.[7] A picture emerges of the firm creating an organization to minimize costs for a given

[5] For the purposes of this paper it will be assumed that only one-plant firms exist.

[6] Temporary National Economic Committee, *Hearings*, Part 26, Washington, 1940. H. Staehle, 'The Measurement of Statistical Cost Functions', *American Economic Review*, 1942.

[7] George Stigler, 'Production and Distribution in the Short-Run', *Journal of Political Economy*, June 1939. Andrews, op. cit., pp. 93-7.

output, taking into consideration the possibilities of growth. As the economist removes one by one the rather rigid assumptions of pure competition, capacity has become less susceptible to being pinpointed and instead has had to be considered in terms of a range. Examination of the managerial viewpoint of capacity should add further clarification to the concept.

THE STEEL MANAGER AND CAPACITY

There is considerable reluctance on the part of steel managers to consider capacity as any fixed figure theoretically feasible at a particular time. Capacity is not viewed as something definite and unchanging, but rather as dynamic in nature. If an estimate is required it tends to be given in terms of production possibilities under normal operating conditions, and is most likely based on actual performance in the present and immediate past. The focus of the technical man is directed toward production efficiency in relation to costs rather than toward maximum potential under idealized circumstances. The manager also does not think of model periods as economists do, but in terms of a continuum of production in which he is always making such changes in plant and equipment as are appropriate and planning toward future changes not possible at the moment.

A plant or an item of equipment is placed into operation on the basis of a standard or designed capacity, but it is recognized that its actual production potential is capable of significant variation from this norm. Growth is normally allowed for by building in flexibility or by creating larger units than are actually necessary for current demand requirements. Assuming that no problem of adequacy of demand exists, which has been a realistic assumption for the last decade and a half, then production of iron or steel from the unit installed tends gradually to expand through successive minor technical changes and improvements in technique. As the furnace or plant is 'broken in' with crews working as teams, raw materials flowing smoothly, fuel system functioning properly, and handling equipment performing well, production tends to rise above the designed level. At the same time continuous attempts are made to step up efficiency and cut costs by a variety of methods, such as reducing fuel consumption, improving preparation of raw materials, installing better handling equipment, and using more effective fuel-firing systems. As a consequence of these efforts production tends gradually to increase with time to a level substantially above the norm of designed capacity, still limited by the basic characteristics of the plant or equipment and existing

techniques.[8] Paralleling these short-range improvements is a longer-range search for improved technical methods of production which are expected to change basic techniques. Current examples include continuous casting of billets, building of furnaces with a basic roof, and experimentation with new firing techniques, and the research laboratories of the industry are experimenting in many other directions. Investment then proceeds on the basis of the new techniques, which become the norm for subsequent designed capacity.

An example of the dynamic nature of capacity in a progressive firm was recently provided by the experience of a British steel plant experimenting with sinter production. Research was initiated with the purpose of increasing output of sinter, made from coke and iron ore fines, and of obtaining information for guidance in building a new plant. Without substantial additional investment, by experimenting with control of the air moving through the sinter bed, production of sinter increased by 124 per cent over a three-year period. During this same period, and mainly because of the improved raw material, the output of iron rose by 55 per cent while coke consumption per ton of pig iron declined by 18 per cent. While it is true that such impressive results are more characteristic of new processes and to that extent are not typical, this example does serve to illustrate the path by which capacity may be increased without major capital expenditure. In this case benefits were obtained at several points in the production process through research at one stage.

At the iron-making stage a number of changes over recent decades, including the use of oxygen and a tendency toward larger size, have tended to raise the output of individual blast furnaces. The basic indicator of capacity is hearth size although formulas based on several variables are sometimes used. Given the size of the hearth the major determinants of output are the quality of raw materials, blowing efficiency, type of fuel, and the capabilities of the handling equipment. The competency of individual crews and managers, and even such a mundane factor as temperature, also affect the rate of output.

Because of the interaction of these many factors there tends to be variation in daily and weekly performance of furnaces, but the supervisor has in mind an expected output or he wants to know the cause of variation. His output norm tends to change over time as

[8] The author has heard British steel-men estimate that minor improvements could raise output above designed levels up to 25 per cent. Rather than halt production to make minor changes from time to time, many adjustments may be made together when there is a major overhaul, unless a minor change promises to be unusually profitable. See P. W. S. Andrews and Elizabeth Brunner, *Capital Development in Steel*, Blackwell, 1952, pp. 270-1.

operating conditions vary. It is usually possible to push out more output at a cost by using better raw materials, more fuel, increased amounts of air or oxygen, or by reducing quality. There are definite limits to the possibilities in this direction, however, and additional direct costs in addition to higher maintenance costs are incurred. Flexibility may be built into a blast furnace by spacing the columns, which makes it possible to widen the hearth when the furnace is relined, and by installing larger blowing and handling equipment than are needed when the furnace is designed.

The primary determinant of output potential of open-hearth furnaces, which make most of the ingot steel in the United States and Great Britain, is size of the bath where the iron and scrap are melted. Other crucial factors are the quality of raw material and the scrap-iron ratio, type and quality of fuel, type of blowing system, and the efficiency of charging equipment. Bessemer converters are built to a particular size, but output may still be affected by many factors. Through the increased use of oxygen, for example, there is a trend toward greater output from existing converters which has reduced the need for investment in new furnaces. As in the case of blast furnaces, melting furnaces are designed for a certain production, but output gradually increases above this standard as the result of minor technical improvements. In one melting shop, for example, fuel oil consumption per ton of steel was cut by 25 per cent at negligible cost by small changes in the feeder system, and further cuts are deemed possible on the basis of research in this field. Pressure can be exerted to step up output by using better raw materials, by reducing quality, or postponing relining, thereby adding to direct costs as well as to maintenance expenses. The production norm thus rises with time, and capacity at any particular time can be exceeded at a cost.

Product-mix assumes a prominent role in the determination of the output potential of finishing mills, which are mechanical in nature rather than chemical as are iron and steel producing furnaces. A section mill or rolling mill is designed for a certain output, with specified products in mind, but extra capacity may be built in to allow for subsequent growth. To cite a case in point, one British firm has a cold strip mill under construction which is designed for an output of 8500 tons per week even though it is anticipated that only 7000 tons will be needed in the foreseeable future. It is considered that the larger-size plant is of a more economical size, the additional capacity costs little, and future growth is provided for in this way. Once the mill is in existence, output per period depends upon size of product, length of runs, and degree of finishing desired.

The maximum speed of the mill can generally be altered only by extensive modification, but a difference in the efficiency of crews and supervisors results in varying outputs under similar conditions. In periods of great demand, when orders can be more carefully selected and the degree of finishing curtailed, long runs of standardized products can be turned out under conditions of high productivity. Shorter runs of less standardized products involves the loss of time in changing rolls and in handling, even though the plant may have a rolling schedule. In specifying the output potential of a finishing plant, therefore, it is necessary to consider the product-mix as well as the speed of the mill and the efficiency of the crews. The possibilities of raising output above designed levels are more limited than in some of the earlier processes although some flexibility exists. In one case a hot strip rolling mill designed to produce 12,000 tons a week actually turned out 18,000 tons after several years of operation as a consequence of small improvements in technique, and increases in the size of ingots. It is also possible to increase the number of shifts and postpone maintenance work to meet pressures on cold metal plants, which are not normally operated continuously, although this raises labor and maintenance costs.

The problem of balance is encountered when the focus of attention is shifted to the plant and the firm. Even though an integrated plant may be designed for an approximate output of specified products, with the various departments well co-ordinated, within a short time the production potential of some departments tends to increase faster than others. As a consequence the output of a plant or firm is limited by the potential at the bottleneck. Various means can be used to overcome bottlenecks if pressure is being put on the plant for products. As has been indicated, flexibility may be built in to individual items of equipment, materials or products in short supply may be obtained from other producers, or furnaces and mills may be pushed for extra output at additional unit cost. Over a longer period the investment program of the firm includes projects designed to balance its various divisions in order to lift the output potential of the organization. Individual projects may be approved which viewed in isolation might not have been considered; the cost of investing versus the cost of not investing in terms of overall output must be evaluated.

During a period of expanding demand, therefore, investment tends to alternate between iron-making, steel producing and finishing facilities, overcoming bottlenecks and raising capacity.[9] Even when activity is stable, there is a tendency to recondition by stages. Varying

[9] See Andrews and Brunner, op. cit., pp. 355-6.

methods may be employed to overcome bottlenecks; for example, if rolling facilities are inadequate a second blooming mill might be constructed to reduce ingots and thus ease the burden on the rolling mill. If activity is not at high levels and technological developments result in greater output than is needed from a department, obsolete equipment may be scrapped or placed in stand-by reserve.

Actually a progressive firm is normally in a state of imbalance, striving for greater efficiency and working for balance simultaneously. An illustration of the factors involved is provided by the relationship between pig iron and scrap as alternative raw materials for steel production, although this issue arises from market forces rather than from internal changes. Many British firms are now striving to increase their capacity to make iron, while the trend was toward a higher ratio of scrap in the immediate post-war period. The more-rapid-than-expected emergence of Germany and Japan as producers of steel, combined with the disappointing yield of war scrap, created a condition of serious shortage of scrap beginning in 1949. The resulting drive to build blast furnaces has produced problems of ore supply and expansion of coke plants, as well as raising metallurgical problems in the melting shops. In addition, the increase in refining time caused by using a higher proportion of iron has tended to lower the output potential of those plants with the limiting point in production at the melting-furnace stage.

Technological and market changes thus keep steel firms in a constant state of flux and make estimates of capacity difficult and tenuous. Designed capacity provides a starting-point for estimation of capabilities although actual output when the plant is broken in may well exceed this norm. Through the influence of many minor improvements in manufacturing technique and the more fundamental modifications resulting from broader research programs, output potential tends to increase over time. Such developments as the use of oxygen in furnaces, the changing over to the use of fuel oil in steel-making and the increased use of sinter all have had significant impacts on the production of iron and steel.

Estimates of productive capacity at a point of time or for the immediate future are nonetheless possible, based on realistic assumptions about operating conditions. What might be termed normal, practical, or effective capacity of a steel plant may be estimated by designating ingots as a criterion, and assuming adequacy of demand and stability of costs. Such an estimate should be based on prevailing techniques and customs, with allowance made for unavoidable interruptions for maintenance and other necessary purposes. Actual production figures attained in current periods under normally

efficient conditions provide a guide for such estimates. Appraisal of the potential of the industry is provided by summing up the total for firms on the same basis. If tremendous demand pressures exist, as during war-time or post-war reconstruction, the capacity of the plant may be raised at a cost in ways already indicated. In addition, that of the industry may be increased by bringing into operation plants on a care and maintenance basis. Attained production may be below capacity levels because of material delays, breakdowns, labor difficulties, and as a result of variations in demand.

In determining the potential output of finished steel products from ingots consideration must be given to the product-mix and to the proportion of process scrap, as well as to balance in the plant. Reduction in yield from ingots to finished products is substantial, averaging 20 to 25 per cent. Experience in the United States provides estimates ranging from 19 per cent scrap for heavy sections and bars to 36 per cent for tubes; in 1947, 63 million tons of finished forms were obtained from almost 85 million tons of steel ingots.[10] Shifts in demand and the lengthy delay in creating new finishing capacity may well result in a bottleneck at this stage with consequent unused ingot capacity. For the short period, however, it can be expected that steel ingot and finishing facilities will be in balance, with a yield relationship which can be estimated. There is also some flexibility provided in the ability of cold metal plants to increase the number of shifts, since, unlike the practice in the hot metal shops, they are not usually operated continuously. Seasonal fluctuations in the demand for finished forms must also be given consideration when capacity is being appraised.

Actual measurement of capacity, based on the concept of normality, is made in the United States as of the first day of each year, and attained production is related to the figures so obtained to determine percentage of utilization. This percentage is taken as a barometer of steel activity and is one of the major indicators of general business activity. The estimate of capacity gradually becomes less accurate as new facilities are added or technical change raises the potential during the year, although the figures showing percentage utilization do indicate fluctuations in attained production on a stable base. In collecting data from steel firms the following specifications are made: 'The figures of capacity desired are your practical capacity, that is, an output which you feel can be obtained under conditions of maximum demand, assuming adequate transportation service and no serious labor shortage. You are especially requested to base your figures on your usual normal

[10] American Iron and Steel Institute, *America's Steel Capacity*, 1950, p. 4.

number of operating turns per week; and to make due allowance for such holidays as you customarily observe, as well as for average time lost for repairs, relining, and for rebuilding of furnaces.'[11] In effect each plant determines how much steel its furnaces can produce under ideal conditions, deducts 12½ per cent for furnace maintenance, and calls the net figure 100 per cent.[12] Performance at over 100 per cent of rated capacity is made possible by the lifting of the actual capacity during the year and by exerting pressure to raise output such as by cutting maintenance time. This type of data has not been collected in this fashion in other countries, although general estimates have been made of capacity and possible future capacity in Great Britain. The post-war steel plan in Great Britain, for example, projected capacity needs five years ahead, but considered that a high rate of utilization would be 94 per cent of capacity.[13] The 94 per cent utilization in effect constituted the normal or practical capacity referred to above.

THE STEEL MANAGER AND COSTS

Overhead costs assume great importance in the iron and steel industry because of a tremendous investment in heavy, specialized plants and equipment. During the investigation of the American steel industry a decade and a half ago, it was brought out that fixed costs of one corporation were 15.4 per cent of total costs at 100 per cent capacity and 57.2 per cent of total costs at 10 per cent of capacity. Direct costs, on the other hand, are considered to be relatively constant for normal ranges of output of the plant. Consequently, operations at a high rate of capacity are required for minimization of total costs. When pressure is exerted for production at levels above normal capacity additional costs are incurred for better raw material or fuel and increased maintenance. As the rate of utilization declines unit fixed costs increase without compensating decreases in material and labor costs.

When the focus of attention is shifted to the industry consideration must be given to the fact that plants vary markedly in efficiency, so that the relationship between costs and output is more complex. Rule-of-thumb estimates made before the war in the United States suggested that the industry could 'break-even' at 55-60 per cent utilization of capacity with profits above that level and losses below. Construction costs have risen faster than steel prices since then, which indicates that the break-even point would now be at a higher

[11] Temporary National Economic Committee, op. cit., p. 61.
[12] 'How Much Steel Capacity', *Steel*, Cleveland, March 21st, 1949, p. 70.
[13] British Iron and Steel Federation, *Report to the Ministry of Supply on the Iron and Steel Industry*, London, December 1945, p. 5.

level, perhaps 70 per cent. On the other hand additions to capacity have been made at costs below that of new facilities through the influence of technological advances, which mitigates somewhat the influence of high construction and machinery costs. What actually happens when activity lessens is that the high-cost facilities are closed down first, which tends to counter-balance the effect of higher unit overhead costs. Conversely, when products are turned out under pressure by utilizing inefficient units and pushing existing facilities costs rise rapidly.

The experience of the American steel industry during the current readjustment period, with production at levels well below capacity, will be instructive regarding the break-even concept under post-war price and cost levels. Because of the enlargement of capacity at relatively low cost through technical change and the purging of obsolete and inefficient facilities as activity has lessened, it is very likely that profits may be made by efficient producers even though operations may be at 70 per cent of capacity. It is also true that individual plants may be operating at high levels, even though the industry as a whole may be depressed. The British industry is still operating at high levels of utilization so that similar data will not be available. It should be noted, however, that prices are set by the Iron and Steel Board at a level which result in losses to inefficient producers in each product line.

CONCLUSIONS AND IMPLICATIONS

A salient conclusion arising from this analysis is that steel capacity of a firm or of the industry is not something definitive and unique, either theoretically or in practice. It is possible, nonetheless, to estimate the approximate output attainable from the firm or industry, based on given supply and demand conditions and customary operating methods, and with a reasonable degree of precision. Such a measure is computed by the American iron and steel industry and serves a useful purpose in indicating the general state of activity of the industry. This normal capacity, moreover, tends to rise over time, both through gradual technical change and through major additions to plant and equipment. When demand pressures are exerted, as during war-time or peak business periods, it is also possible to raise output above normal expectation by various means at additional cost. There are definite limits to the increases possible by these measures, set by the stock of plant and equipment, which is usually employed on continuous schedules.

A close relationship exists between the proportion of capacity utilized and the burden of fixed costs, which indicates that a firm

operates at its most favorable position cost-wise in the vicinity of normal capacity. Actually, there is a range of output within which average costs tend to vary little, being affected more by real world uncertainties and differences in managerial ability than by output variations. As output declines average costs rise because of the influence of fixed costs, and output can be raised only by exerting pressure on facilities at additional cost. Instead of a timeless cost curve during the short-run, however, it is necessary to think of a cost curve which is shifting continuously through the influence of many changes in technique and mechanical or chemical improvements. At the same time capacity is being increased by technical change so that the idea of the short-run as a period during which facilities are fixed loses its meaning. Changes in capacity and in the rate of operations tend to occur simultaneously, with consequent movement along cost curves and shifting of curves. For the industry as a whole average costs are probably lowered for part of the range as output declines below normal capacity because of inefficient units ceasing operations, even though overhead costs on a product unit basis tend to rise. Similarly, in periods of steel shortage obsolete equipment may be brought into use at a higher cost level.

This dynamic concept of capacity has important public policy ramifications because of the strategic role of the iron and steel industry in highly industrialized economies. It is desirable that the industry possess sufficient production potential and expands at a rate adequate to meet any probable increase in demand without necessitating an undue rise in prices caused by rapidly rising marginal costs.[14] Not only must the program of expansion be adequate in terms of quantity of output, but the additions to capacity must be in the proper product lines to meet changes in the structure of demand. Further complications result from war and the threat of war which distort the structure of demand and exert tremendous pressure on facilities. The creation of capacity based on such considerations, even granting the ability to project needs adequately, both quantitatively and qualitatively, at least several years ahead, means that there would be large reserves of unused capacity in the event of the type of cyclical decline experienced in the past. It is unrealistic to suppose that the full burden of maintaining capacity in being above the level of average demand can be met by anyone other than the consumer, either directly or indirectly. This critical issue of adequate size arises with the iron and steel industry, and with other industries which require tremendous investment in specialized equipment

[14] George Terborgh, 'The Problem of Manufacturing Capacity', *Federal Reserve Bulletin*, July 1940.

which takes several years to build. It is possible to meet temporary surges in demand in some industries by increasing the labor force or in other ways, but in steel the bottleneck lies in fixed equipment which can be on hand to meet any need only at a cost.

Full development of this point is beyond the scope of this paper which is concerned primarily with the meaning of steel capacity. Other problems created as capacity tends to increase, such as that of the exhaustion of some of the richest and most accessible iron ore deposits, which raises cost and technical problems, also must be passed over. When public issues arise with regard to the pricing methods, competitive structure, or productive ability of the iron and steel industry, however, the concept of capacity in all of its facets should be assigned an important role in the analysis.

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RESEARCH AND CONTROL IN A MODERN SUPERMARKET[1]

by Donald E. Stout

The growing interest in industrial and marketing research in recent years may be attributed to a number of factors; but whatever reasons one assigns to the fact, the research departments of individual firms have been enlarged and have assumed an increasingly important role in conducting investigations upon which policy decisions are based. The activities of consulting agencies in the post-war period have been noted in several recent articles,[2] but the changing role of the research departments of individual firms has attracted less attention. It may be of interest, accordingly, to view the research activities of a modern supermarket in the United States, Stop and Shop, Inc., as an example of the research activity of a progressive firm.

The Marketing Research Department has assumed a progressively more important position with the growth of the firm. With the pressing need for research which accompanied the decision in 1938 to enter the supermarket field, it has since been enlarged several times and has been provided with the facilities necessary for pursuing a more extensive research program. Established as an aid to management, the research staff has the goal of providing management with the factual and analytical basis upon which to make decisions concerning operations, control, and prediction within the firm.

In practice this means that the research staff is prepared to study a surprisingly large number of different types of problems. In 1952, for example, a sample list of research problems which the staff had investigated over a fourteen-year period itemized 49 separate projects.[3] In this article, I should like to examine three areas of research which involve problems of rather general interest to both businessmen and economists. I shall discuss research concerning

[1] This article has profited greatly from the constructive criticism of Professor Arthur H. Cole and Dr. Hugh G. J. Aitken of Harvard University, and of Dr. Howard Green of the Marketing Research Department of Stop and Shop, Inc. I also wish to voice thanks to the Research Center in Entrepreneurial History, Harvard University, with which I was associated while doing this research. Any shortcomings which remain are due solely to the author.

[2] I. S. Lloyd, 'Operational Research', *The Journal of Industrial Economics*, Vol. I, No. 3 (July 1953), pp. 175-86; C. C. Herrmann and J. F. Magee, 'Operations Research for Management', *Harvard Business Review*, Vol. XXXI, No. 4 (July-August 1953), pp. 100-12.

[3] William Applebaum and Richard F. Spears, 'Marketing Research in a Grocery Chain', *The Journal of Marketing*, Vol. XVII, No. 1 (July 1952), pp. 52-6. Also see William Applebaum, 'Marketing Research in a Grocery Chain', *Executives Service Bulletin*, Metropolitan Life Insurance Company, November 1941, p. 5.

(1) sales prediction and control, (2) experiments to improve operating procedures, and (3) locating new units.

SALES PREDICTION AND CONTROL

The detailed record of past operating experience is used by the Marketing Research Department to develop sales quotas and budgets. In arriving at budgets, an intensive study of the past performance of each store is made, comparisons are made with other units which are similar in some respects, with stores which are different in terms of certain performance categories, and with the performance of the organization as a whole. In setting budgets for a particular item or department such as meat sales, the past sales of each store are tabulated and grouped so as to locate the store in one of a group of stores classified according to such characteristics as:

(1) *Sales:* total sales of all departments; the volume of meat sales; meat sales as a percentage of total sales; and sales of competing goods such as fish and dairy products.
(2) *Type of store:* self-service store, supermarket, or combination store.
(3) *Type of community:* population and physical size of trading area, and income levels in the area.

It would be desirable, as an ideal, to take account of all factors other than meat sales so as to permit that item alone to be free to vary. In practice what is done is to develop estimates of expected sales of an item for each group of stores in relation to total sales. Deviations from the estimated sales are then studied to learn why the sales of a particular store within the group vary from the expected normal. When it is found that such variations exist and are outside the control of the individual store unit or of the parent firm, consideration is given to modifying the specific quota in the budget for the store in question.

If no explanation is forthcoming as to why the actual results deviate from anticipated results, the matter becomes a problem for further research and experimentation. The analysis of store operations is thus oriented toward understanding what happens as a prelude to, or basis for, action. Operating results are subjected in this fashion to continuing scrutiny and quotas are modified in a manner which tends constantly to diminish the gap between expected and actual operating results.

There is a persistent effort to modify budgeted quotas in response to actual performance records so that the gap between expectations

and operating results is constantly narrowed. The method provides a workable way in which to unite influences external to the firm and internal factors which are susceptible to control by the firm. If the relationships between these two classes of factors and between these and the multiple variables potentially susceptible of internal control are not capricious, it is conceivable that empirically derived uniformities might afford stable bases for prediction. This does happen in fact. The estimates of such magnitudes as expected dollar sales in future periods are amazingly accurate.

Why should these predictions be accurate? How can empirically derived rules be used successfully when the variables selected are singled out because of the needs of management? The influences actually at work include both factors which are not identified and factors which, although identified, cannot be expressed in quantitative terms. Even within the context of factors which can be identified and quantified, it is frequently impossible to specify the nature of the functional relationships. There is no reason to expect that variables which are isolated for such pragmatic reasons from a confusingly complex population in which many factors are involved will exhibit other than erratic behavior. It does work, however, and that is the ultimate justification to a person responsible for action. Action and control do not require a coordinate and explicit theory of the relationships. The question to which management must have an answer is 'what will be' rather than 'what should be'. Perhaps economic analysis might profit by investigating more exhaustively successful business practices as the starting point for economic theory concerning business behavior.

EXPERIMENTS TO IMPROVE OPERATING PROCEDURES

Another area of research centers on a list of problems which have in common the purpose of finding out the effect of introducing changes in operating procedures. These changes are relatively minor in the sense that the results affect overall operations by increments which are more of operating interest than a life-and-death matter. The goal is to improve the efficiency of the retailing procedures in use. The experiments involve changes which, in a sense, are innovations in that they entail new ways of doing things; but the investigations could also be viewed as a continuing effort to find better combinations within classes of products already being handled. These tests are aimed at finding out customer reaction to and the effectiveness of certain products sold under different circumstances and of certain technical devices such as lighting fixtures, display counters, and checkout stands. The latter type of

experiment frequently involves a study of work loads and reliance on cost accounting records. Since the method of analysis is basically the same in the two types of problem, I shall confine the immediate discussion to studies concerning the effectiveness of different price units, packaging units, and displays.

One method which is employed most successfully by this firm is called controlled experimentation.[4] The method attempts to perform the classical kind of physical laboratory experiment by studying the behavior of one characteristic in response to the influence of variations in one variable while all other factors are held constant in the sense that their influence is controlled and identified. A controlled experiment is set up in which the action of one variable is isolated.

As in the case of developing sales quotas, the detailed statistical records of past store performance are used to group stores into classes which are similar in certain respects. Two groups of stores, the test group and a control group, are selected from a class of similar stores. While the experiment is conducted with the test group, the control group of stores is studied for an indication of the operating results to be expected during the test period in the absence of the experiment. Analyses of the records of the test group and of the control group are made for the pre-test, test, and post-test periods. The result is a more or less successful attempt to isolate the variable under observation.

This type of experiment is affected by a great number of variables — the season, weather, income and income changes of customers, advertising, the actions of competitors — over which no direct control can be exercised. If all of these forces could be directly controlled, the resulting situation would be artificial; and there still would be no justification for projecting the results of such an atypical situation into the analysis of a real operation. The procedure which is adopted, on the other hand, allows these forces full and natural play but controls their influence by setting up an experimental condition in which these elements will exert themselves in the same manner and to the same degree in two or more places at the same time. The forces not under study are thus controlled indirectly and a controlled laboratory experiment becomes possible. This is the purpose of using two groups of stores for an experiment, the test group and the control group.

The validity and usefulness of the results will depend largely on

[4] William Applebaum and Richard F. Spears, 'Controlled Experimentation in Marketing Research', a paper presented at the National Marketing Research Workshop, U.S. Department of Agriculture, University of Minnesota, September 3rd, 1949.

the comparability of the two store groups. The two groups must be matched as groups and as units. Lest a fire or some unusual action by a local competitor of one store invalidate the experience of the whole group, it must be possible to eliminate a similar store from the performance of each group. Each group accordingly consists of stores which are chosen in pairs, one twin being placed in each group. The criteria of comparability will vary with the subject under experiment, but among the criteria regularly used in these experiments are:

(1) *Type of store:* supermarket or conventional combination store, whether self-service is practiced, and the number and kinds of departments;
(2) *Size of store:* floor area, parking facilities, physical and dollar sales by department and by specific items, and the number of customer transactions;
(3) *Trading area:* population size and distribution, income and ethnic patterns, newspaper advertising area coverages, and type of location in relation to communication routes and competing stores;[8]
(4) *Shopping habits*: the proportion of male and female customers, shoppers alone or with children, frequency of store visits, length of patronage, and average sale per transaction.

If there are enough stores from which to choose a sufficient number of acceptably comparable stores, it is, of course, also possible to use the same control group for several test groups, each of which is being employed simultaneously for a different experiment. This is a question of the amount of research to be done and of time and budget limitations.

Simultaneous multiple testing, however, does make possible an interesting class of price experiments which may have some unexpected theoretical implications. Experiments have been conducted which compare the sales of an item at a different price for each test store and, a different problem, the effect of varying prices uniformly in each of the test stores. The one affords information concerning the relevant portions of a special kind of demand function abstracting from time and broadly analogous to a static demand function, while the latter throws light on the dynamics of price changes.

A third class of price experiments concerns a very real problem not treated in economics, the effect of the quantity unit on price-

[8] William Applebaum and Richard F. Spears, 'How to measure a trading area', *Chain Store Age*, Vol. XXVII, No. 1 (January 1951), pp. 177ff.

quantity relationships. This is a relationship between sales and the prices at which each of varying unit combinations are offered. For example, if an item regularly sells for an amount p, what is the effect on sales of selling the item at two for 2p or $2p \pm 1$, or at three for 3p and $3p \pm 1$, 2 or 3? The results of actual experiments of this nature reveal that better sales can sometimes be obtained by selling in multiple units at a higher unit price.

Assuming for the moment that the stores in each test group have an identical counterpart in the control group and that the groups are large enough to afford reliable results, there remains the problem of interpreting the results of experiments. The interpretation of the effects on sales of lowering prices in conjunction with a promotion raises questions concerning the effects on future sales and on contemporary sales of related goods. If a price promotion increases sales of an item, is the increase at the expense of sales of related items or of future sales? Increased sales of an item during an experiment may be due in part to customers buying less of something else, especially if the housewife operates on a fixed budget allowing so much for food each week; or the increased sales of an item may reflect that the customer is stocking up on that item and that increased sales in one period are at the expense of fewer sales in the next period or periods.

These problems are recognized and dealt with by dividing the period of the experiment into equal pre-test, test, and post-test observations of the variables under study. The post-test observations are designed to determine how much of the increased sales during the test period were due to stocking up at the expense of decreased sales in the post-test period. Data showing sales of related goods in each period provide a measure of the increase in sales during the test period which were due to decreased sales of other items. The pre-test observations reinforce judgments on the comparability of control and test stores and give an idea of the range of values to be expected in the variable in the absence of experimentation.

Experimentation with prices and quantity combinations provides answers which can be used in price policy. Other than the research expense, these decisions involve no additional cost of supply, selling or administration. Other experiments, such as studies of pre-packaging, displays, and technical changes do involve a cost. This introduces additional factors into the problem but does not alter the principles of controlled experimentation.

How can one be certain that the stores selected for the control and the experimental groups are satisfactorily alike, that a sufficient number of stores is employed to derive reliable results, and what

decides whether the results are reliable? There is no absolutely satisfactory criterion of similarity in selecting comparable stores. What is done is to describe a store by a number of characteristics, arrange the stores under each description in an ordinal array, and select as comparable those stores which are most alike in the characteristics which are thought to be important for the projected experiment. These criteria of comparability are gradually evolved on a basis of past experience which has indicated that certain factors are of importance in certain kinds of situations. It is the same with criteria for a sufficient sample. These standards are chosen on the basis of experience and modified by trial and error until acceptable classifications are obtained. Procedures thus evolved are found empirically to provide acceptable accuracy for prediction and for decision.

This is what economists as well as businessmen actually do when confronted with a specific economic problem requiring a judgment of some kind. There appears to be a sharp distinction in practice between the approach used by economists to theoretical and to actual problems, and a discouraging lack of transfer of procedures or results from the one to the other. A distinguished economist and able theorist once remarked in a talk that when confronted by a complex problem, his procedure was first to list all of the factors which he could conceive of as possibly being relevant. After studying what material he could find as to the behavior of these variables, it then became largely a matter of art rather than of analytical science to render a judgment. These remarks were offered in the specific context of public policy on economic questions, but I suspect that the same procedure is more generally followed by empirical investigators than is admitted. One among many examples of this practice is expressed in an article concerning attempts to derive preference maps by empirical methods.[6] Two of the conclusions of this article are that the failure to derive preference maps by experimental or statistical methods is due to characteristics inherent in the concept of indifference analysis; and that the inability to derive preference maps by empirical procedures has had no effect on studies of consumer behavior despite the key position of indifference analysis in the theory of consumer behavior.

Insofar as economic theory does not provide concepts which are identifiable in available data, the empirical worker must necessarily attack his subject directly. This is what has been done in selecting

[6] W. Allen Wallis and Milton Friedman, 'The Empirical Derivation of Indifference Functions', in Oscar Lange (editor), *Studies in Mathematical Economics and Econometrics: In Memory of Henry Schultz* (Chicago: the University of Chicago Press), 1942, p. 175.

acceptable criteria for controlled experimentation. Experience and the test of successful prediction dictate whether classifications and procedures are satisfactory.

LOCATING NEW UNITS

A third major area of research which deserves consideration deals with the problem of the location of new units. The selection of good sites for new supermarkets became progressively more difficult as the total number of supermarkets increased and the more obviously good locations were utilized; and as the initial capital costs of constructing new units increased, any success by the research department in reducing the risk involved in new openings would be of correspondingly greater value for the concern. In an address to the National Retail Dry Goods Association, the general manager of the firm attested that the research department had made it possible

> . . . to select, with amazing accuracy, supermarket locations on a basis that approaches a science . . . Our market research department has not only gone out and selected locations for us, but has also given us estimates of potential sales in advance of acquisition of a location. In practically all cases the sales achieved did not vary more than a modest percentage from the estimates submitted.[7]

The discovery of prospective store sites may originate from the real estate department, from other real estate dealers who contact the firm, or from continuing studies made by the research department itself. In the first two cases, the proposal reaches the research department in the form of a statement that a specific site is available and can be obtained for a certain asking price. The research department is confronted with the problem of transforming this proposition into a statement of the estimated volume to be expected from a store of a certain size erected on the site. The capital and operating costs are then compared with sales and revenue, comparisons of the estimated operating results of the proposed store and other units are made, and a quantified picture of the desirability of the proposal is then presented to management for a decision. The first step is to derive an estimate of sales.

As in the case of quotas and market experiments, the sales estimate procedure requires the selection of comparison, or control, stores. Certain specific items of interest are studied for each store. Averages

[7] Sidney Rabinovitz, 'Trends in Retail Distribution', as quoted in Applebaum, 'Marketing Research', op. cit., p. 5.

of past operating data are used together with population and income maps to draw up schedules showing, for example, population around the site, and per capita and total sales volume in concentric circles with radii of one-fourth, one-half, three-fourths, and one mile and over one mile. A schedule is drawn up for each of the comparison stores which shows the magnitude, by size of area, of each of a list of characteristics of the store and its trading area.

The logic of this procedure is employed, in actual practice, by using some of these very characteristics as criteria for selecting comparison stores. Continuing records are kept on each store which show the historical and present operating records for each of a series of characteristics which are thought to be relevant in assessing a proposed location. These characteristics include a class of items which are independent of the store, being characteristics rather of the trading area. The corresponding data for this second class of variables are determined for the proposed site, and other stores with comparable trading areas are selected for comparison. The unknown characteristics of the proposed site are then projected from the corresponding values of those characteristics exhibited by the comparison group of stores. The completed analysis predicts that the sales volume of a store opened on the proposed site will be so much per week in the first month, at the end of six months, at the end of one year, and by the end of the second year, by which time the store is regarded as an established and going operation.

Estimated volume seldom varies from realized sales by as much as five per cent. If estimates were always shown to have been perfect, it would be plausible to infer that the estimates were on the conservative or safe side. Conversely, insofar as estimates are cautious, it will require less selling effort to justify the estimates. This suggests that, within a certain margin, various types of selling activity may serve to cancel out discrepancies which otherwise might appear between estimated and realized sales. The fact that such selling activities involve added expenditures, however, implies that this margin is rather limited; and the uniform success of predictions presumably reinforces this conclusion.

Besides analyses of site proposals which come from outside the research department, the research department itself originates suggestions to the firm's real estate subsidiary that the firm might well consider locating in a particular area. This brings in an aspect of research which may carry interesting implications for theorists. The research men have learned, from the experience of the food retailing industry as well as from their own experience, that the average profitable life of a supermarket is relatively brief and

apparently a constant figure in the absence of major changes in the store or the market. This fact suggests certain lines of inquiry concerning why the profitable life is so short and apparently a relatively constant period.

If an answer is found, are there certain policies which can prolong the active phase of a supermarket? Research along these lines has shown that one class of factors involved has to do with changes in the trading area. Changes in population, in income groups represented in the trading area, and in the nature of competition squeeze the volume and profit margins of the store either in absolute terms or in the relative sense that the opportunity cost of the investment is so much greater than elsewhere that a move or abandonment becomes desirable. These factors consequently are kept under periodic review for the entire geographical area in which the company operates. Being a survey of factors influencing supermarket operations which includes areas in which the company has no units, these studies sometimes reveal that a new area has become, perhaps for the first time, a desirable area in which to locate.

SUMMARY AND CONCLUDING COMMENTS

It is noteworthy that the methodology is the same in these three areas of research. In each instance, the assumption is made which is necessary to lend meaning to any statistical induction, that there is an underlying uniformity in the universe. Those factors which are thought to be relevant to the problem are used to describe the characteristics of the object under study. A counterpart or an object similar to that under study is then identified in the body of available data. Finally, the characteristics of the control, or comparison, group are used as predictions of the values of the corresponding unknown characteristics of the test group under study. The criteria of comparability as to quality, quantifiable elements, and sufficient samples are chosen on the basis of past experience and modified by further experimental results. The selection of elements which describe the population and samples adequately enough for acceptable prediction is developed by empirical experience. Perhaps this is the only way in which this class of problems can be studied successfully.

The trial-and-error nature of these procedures contains certain further implications for the relationship between innovation and research. As trial-and-error repetition results over time in improved and more exact procedures and better criteria of comparability, the process of introducing a particular type of innovation is simplified. Repetition tends to decrease the uncertainty inherent in innovation.

The first attempt by a concern to introduce what is for it an innovation is more difficult than repetitions of the innovation because the absence of past experience injects greater uncertainty into the decision. At the same time, however, the very absence of precedent facilitates the first attempt because there is a wider margin of permissible error.

Although repetition tends to evolve standardized procedures and a consequent decrease in uncertainty, repetition of an innovation by the firm and by its competitors tends to diminish the advantages which originally precipitated the decision to innovate. In the case of supermarket locations, for example, the original locations were selected without the benefit of methods which were subsequently developed for predicting the sales potential of the location; but there were so few supermarkets at the time that the chance of selecting a good location from among the actually relatively large number of good locations perhaps was so great as to counterbalance the later need of more exacting procedures. As the better sites are occupied and the competition of new supermarkets increases, the margin of permissible error diminishes and the importance of research increases.

Insofar as trial-and-error is a necessary aspect of the process of developing satisfactory methods of control and prediction, the large firm has a built-in stabilizer in that it can conduct necessary experimentation in one sector of its operations without jeopardizing the existence of the whole. The activities of the Market Research Department of this firm have expanded in response to this possibility and to the necessity of reducing the risk and uncertainty attendant upon the operation of a growing firm in a changing economic environment.

There is a real problem of control and prediction confronting the firm if it is to improve operations and decrease the uncertainty and risk inherent in change. The problem is not cast in terms of maximizing or minimizing anything, and I suspect that it would be meaningless to formulate this type of problem in terms capable of solution by the maximizing principle. If this is the case, it would appear that contemporary economic theory is intrinsically incapable of being of use in this type of problem on two grounds. Built on concepts which have no actual empirical content in the sense that the concepts have no directly identifiable counterparts in available data, logical operations with these concepts can say nothing about the future. Economic theory, furthermore, is not addressed to this class of problems because, being based on the logic of the maximization apparatus — what has been called the postulate of rationality —

it is inappropriate for a class of problems which have better solutions rather than best solutions.

As soon as the assumption is made that something, such as profits, is to be maximized, certain further assumptions must be made regarding parameters of external economic pressures in order to isolate cost and revenue functions. Those assumptions will make the answer contingent on predictions involving an unacceptable degree of uncertainty. The executive faced with working control can not profit from a line of reasoning which thus shifts the problem rather than solving it. Quite aside from challenging those assumptions, however, the answer afforded by economic theory would be a solution which was only *conceivably* operational. It would not be actually operational because it would require that management work with concepts which can not actually be identified in available data. Instead, the procedures followed, as exemplified by the discussion in this paper of the research activities of a modern supermarket, are at once less impressive in their simplicity and much more dramatic in their results because the methods work.

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THE ACCURACY OF DATA COLLECTED FROM FIRMS

by Ernest Rudd

How reliable are our facts and figures on the working of British industry? This was one of the problems considered by a conference on the difficulties found in the collection of data from firms, held recently by the Acton Society Trust. The conference was held in the belief that, although people looking for different things must adopt different approaches, there is a sufficient common basis to the search for facts in industry to make an exchange of experience among research workers worthwhile. The twenty-five people invited to the conference were therefore drawn from a range of studies in the social sciences — including economists, sociologists, psychologists, statisticians, and those all-in wrestlers who do operational research.

Some of the topics discussed were of interest chiefly to research workers. Should the research worker, for example, have any technical knowledge? If he is studying the details of processes in the factory he clearly needs such knowledge, but if he is making a more general study of, say, prices, a display of too much knowledge may make firms unwilling to give him information. There was also some discussion on how to get an entrance into the firm in the first place, and, having got there, how to win the co-operation of everyone on whom one is dependent for information — being on good terms with one department in a firm frequently makes one *persona non grata* with another. But when the conference discussed the sort of errors to which data collected from firms are subject, it was dealing with matters of interest to the much wider public who use these data when they have been processed and published in the form, for example, of economic statistics.

To understand the type of error that is liable to occur, we need first to look at our published facts and figures in their embryonic stage, as primary data. One of the most common forms in which primary data are collected is 'the little black book' — the notebook kept by the foreman on the job. If, as often happens, the foreman is only semi-literate, one source of error is obvious. A similar type of primary data is the return completed in a small branch depot and sent to the head office — one investigator, inquiring into the efficiency of horse transport, discovered what appeared to be a remarkable performance by the horses at one depot. In fact the depot had had no horses for twenty years, but the man who sent in his 'stastistics'

to the head office was putting down details of the motor vehicles on the wrong form. Mistakes in recording data are not, of course, made only by the less educated workers, but a lower level of education makes them more likely. So, for the collection of certain types of data (on, for example, manufacturing operations) mistakes can be reduced in number by using observers; but this is an expensive way of doing it, the presence of the observer may affect the behaviour of the workers, and observers are fallible too.

Human fallibility made some of the research workers at the conference sigh for automatic recording devices to produce their primary data for them. But even the machines are sometimes liable to err, or at least to produce data which have to be interpreted with care. For example, some of the automatic vehicle counters, which are used for collecting figures of the flow of road traffic, are operated by the vehicles applying an indirect pressure against a spring to close an electric circuit. If the spring is too heavy, cycles and light motor-cycles may not be recorded; if it is too light, heavy goods vehicles may record themselves twice.

Often the data collected from firms are not in their primary form but have already been processed by the firm for its own needs — for its accounts, for example. The big difficulty here is that figures kept in a form which suits the firm perfectly may not be suitable for the purpose for which the research worker, or government department, needs them. This is particularly likely in the case of cost figures, where the firm probably adopts conventions which it may forget to explain when supplying data. Further, simple copying mistakes may occur at this stage, and also the figures may be given a spurious accuracy as happens when an amount that the operator reckons is roughly a third of a ton becomes 747 lbs.

For anyone who thought that the main problem of the research worker studying industry was the lack of data, the conference brought one surprise. Of course a lot of seemingly important data are lacking — in particular few firms know the costs of their individual products — but everyone was agreed that the records kept inside firms are many and various, and that the management rarely know of the existence of all of them, and indeed often know of only a few of them. One speaker said that in an ordinary firm employing 1000 persons it would take three months to discover and list all the records kept. One example of an unofficial record that was quoted was a case where a retired employee of a firm had in his personal possession complete nominal rolls (including religion) of all the firm's employees, inherited from his father and grandfather, and going back to the 1830s. It has frequently been found that records

covering the same things may be kept by a number of departments for their own needs on different and non-comparable bases. When the employee keeping the record changes there is probably a change in the method by which it is kept, although this fact may not be clear to the research worker.

Two other forms of data used by some economists are the firm's files, and people's memories. These are especially necessary for anyone who wishes to study the reasons for particular types of decision. The file, here, probably does not give the whole story, so that it has to be supplemented by the information given from memory by members of the firm. But memory is apt to play odd tricks. It may be demonstrably wrong on the verifiable facts; and on the reasons for decisions it may tend to include in good faith considerations which were not thought of until after the decision was made, but which, if they had been thought of in time, would no doubt have weighed in the right direction. This follows from the nature of the process of making decisions. When the process is of the 'this-is-my-decision-and-these-are-the-facts-I-base-on-it' type it is very easy for the research worker, investigating the matter some years later, to come to quite the wrong conclusions.

Pride of place amongst causes of error in getting and handling data must be given to misunderstandings of one sort or another. One speaker told the conference how he noticed an interesting pattern in a series he was averaging of the numbers of ingots in furnaces. An analysis of variance made the pattern look even more interesting, so he decided to follow up what might be a useful line of inquiry, and went to ask for the furnace numbers. He was told he had them already — they were the column of figures he had averaged.

Misunderstandings are particularly likely to occur where data are obtained by means of a questionnaire thought up in an armchair. A questionnaire on research effort was drafted recently with a great deal of careful thought by people with considerable experience of research in industry, and, as a further stage, the draft questionnaire was tried out on a number of firms. The guinea-pig firms were visited by a research worker who discussed with them what research and development work they did, and then discovered what they would have put down on the form. A comparison between the two, and a general discussion on the clarity of the form, showed whether it had been understood or not. Of some fifteen firms visited, only one said they had found the form perfectly clear and comprehensible — they carried out no research or development work of any kind whatsoever. The really striking thing about this inquiry was that,

although everyone else visited had found something that was not clear, each had found something different and apparently clearly understood the points the others had found obscure. Slight changes of wording cleared up these difficulties, but it seems likely that, even now, other firms will find phrases to misunderstand. Further, no amount of amendment will prevent mistakes being made by people who have simply not read the short questionnaire properly.

Another cause of error is the omission of important information. R.A.F. clerks sending in returns on mechanical trouble with aircraft used apparently to omit the most common types of fault, on the ground that everyone knew that the —— had that sort of trouble. Chemists recording the results of several successive analyses may omit the ones that vary too widely from the rest and do them again. A research worker studying delays in a process found that they had a normal frequency distribution, except that it was cut off sharply at a maximum delay of four hours. It turned out that any component delayed more than the four hours was put on one side and not recorded.

Then there is the bias due to people being more willing to disclose their successes than their failures, and with it that caused by the man who is anxious to prove something offering only the data that support his point of view. Both biases particularly affect the research worker who has to obtain permission for publication from the firms whose data he has used. He is very likely to find himself subject to pressure to exclude this and alter that.

Lastly the research worker may find that his data, collected for some other purpose, contain deliberate misstatements. This is the sort of problem that would have faced anyone analysing data derived from petrol rationing. A similar case is the story of an industry in which there are two trade organizations, with a membership made up largely of the same firms, and both employing the same man as secretary. Both organizations collect figures of numbers of employees from their members, but when the secretary compares the two sets of figures he usually finds that the figures sent in to one organization are lower than those sent to the other — one organization charges a membership fee proportional to the number of employees, the other one does not.

This list of errors which arise in the collection of data from firms does not mean that most of the data used in economics and the other social sciences are completely unreliable. The ways of reducing errors are almost as many and various as the errors themselves. Chief among them are thorough investigation, care, scepticism, technical knowledge of the industry studied, and plain common

sense. Wherever possible a sample of the derived data being used should be compared with the primary data from which it was obtained, in order to show the method of derivation and degree of accuracy. It may even be necessary, particularly when studying costs, to discard the tidy derived data completely, and work entirely from the primary data. Making a complete list of all the records kept in the firm often shows that the same information may be obtained from more than one source, and thus cross-checked — although if the answers are different it is not always possible to see which is right. The degree of thoroughness required to remove most of the errors makes an inquiry considerably more expensive. Where this would make an investigation too costly, part of it can be done on these lines in order to give an estimate of the margin of error of the rest. But at the moment nowhere near all the errors are removed from investigations of any size. The Census of Production, for example, deals only with those errors that are obvious on internal evidence in the forms, so when the report on the census for 1951 tells us that 'about 35 per cent of the large returns were found to be defective or inaccurate' it seems fairly certain that an even larger number of errors was not discovered. The knowledge that economic statistics are subject to a large margin of error does not usually matter, as long as it is remembered that it is there; but it does mean that the planner has not got a highly accurate micrometer gauge which will show him immediately the effect of even the smallest change. Any change which is to be measured with reasonable certainty has to be of fair size.

The other lesson of the conference was that the workers who are carrying out research on industry have many common problems and have developed common techniques. It would be useful if the novice in this work had some means, besides costly experience, of acquiring the necessary skills. The universities might possibly be able to do something here, but it would help considerably if the standard statistical textbooks devoted as much space to the types of error found in the sort of data most research workers have to use as they do to the — relatively unimportant — sampling errors.

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ASSOCIATION WITH SCHUMANIA

by J. Driscoll

The French Government's proposals for the pooling of Western Europe's coal and steel industries were announced by M. Schuman on May 9th, 1950, and were at once welcomed by Mr. Attlee as 'a notable contribution towards the solution of a major European problem'. Subsequently, however, the French Government made prior acceptance of the principle of a supranational Community a precondition of participation in negotiations, and Britain felt itself unable to accept this move towards a federal structure.[1] When negotiations began between France, Western Germany, Italy, Belgium, Holland and Luxembourg on June 20th, Britain was not represented, and in order to avoid any suggestion that we were intervening merely to obstruct progress, only the loosest contact was maintained with Paris during the protracted talks which followed. In general, we had no influence on the shape of the Treaty establishing the European Coal and Steel Community which was eventually signed on April 18th, 1951.[2]

Clearly, however, relations between Britain and the Community could not be left undefined. The High Authority, indeed, was bound by the Treaty to open negotiations with Britain as soon as possible.[3] On the British side, the communique issued after the Washington Conference of Foreign Ministers in September 1951, expressed our intention to establish 'the closest association' with the Community, and this term 'association' was repeated in the communique of August 23rd, 1952, which announced that a permanent British delegation was to be accredited to the Community. It seems unlikely that 'association' had any special concrete meaning in British eyes at this stage; but in the Community, it was taken as implying something much more intimate than a normal commercial treaty, involving 'concerted action of a permanent nature, with responsibilities, rights and obligations shared on a basis of equality'.[4]

As soon as the High Authority had established its Secretariat, a Joint Committee was set up, consisting of members of the High Authority and of the U.K. Delegation. The first meeting was held in November 1952, with considerable publicity, but little further

[1] For fuller details, see *Anglo-French Discussions regarding the W. European Coal, Iron and Steel Industries*, Cmd. 7970, 1950.

[2] For an account of the Treaty and a survey of the Community's economic policies, see J. Driscoll, 'Early Days in Schumania', *Journal of Industrial Economics*, April 1954.

[3] Section 14, Convention on Transitional Provisions.

[4] E.C.S.C., *Report on the Situation of the Community*, January 10th, 1953, p. 34.

activity ensued. The High Authority had by now recognized that Britain's approach 'would be based on experience resulting from the study of practical problems rather than on general principles',[5] and it sought to have an organization in being, producing concrete results, before opening negotiations.

After much delay, the High Authority forwarded a Note to the British Government in December 1953, suggesting the opening of negotiations.[6] It proposed 'as essential points' in any agreement:

(i) Association between the markets, with 'the object of reducing or eliminating restrictive measures which impede coal trade, as well as the reduction or elimination of quantitative restrictions and customs duties on steel'. Moreover, inter-trading 'should be subjected to certain rules . . . established in the form of reciprocal undertakings' which the High Authority hoped would be 'along the lines of those provided for in the (E.C.S.C.) Treaty'.

(ii) Procedure for Common Action, proceeding 'from an exchange of information to decisions concerted together and valid for the whole of the two markets'. In particular, joint action was foreseen on market trends, labour conditions and long-term estimates of home and export demand. In respect of major decisions (e.g., general objectives for modernization, expansion of capacity, etc.), there would be prior consultation and an attempt to reach an agreed policy, although the right to take unilateral action would remain.

(iii) Institutions should be created to supervise any joint rules and to 'give them their full political significance'. The High Authority proposed a Council of Association at governmental level, a quasi-judicial body to interpret the agreed rules in case of disputes, and some form of deliberative body;[7]

In reply, the British Government stated in April 1954, its readiness to open negotiations and to 'examine the whole problem, including the suggestions made in your letter'. Negotiations began in the late autumn and an Agreement was finally signed on December 21st, 1954.

[5] E.C.S.C., *Report on the Situation of the Community*, January 10th, 1953, p. 34.
[6] See *Correspondence regarding the relations between the U.K. and the E.C.S.C.*, Cmd. 9147, 1954. The quotations which follow are taken from this paper.
[7] The pattern follows that of the Community: the High Authority, the Court of Justice, and the Common Assembly.

THE AGREEMENT ON ASSOCIATION

The Agreement[1] reflects the British attitude of caution and reserve rather than the Community's desire for a close and comprehensive relationship, spelled out in some detail. In effect, it does no more than provide a framework: whether contact within that framework is to become permanent and intimate or to remain occasional and remote is left open, to be decided from the British side, on practical grounds, as the situation develops. In particular, the Community has failed to secure two of its main objectives: there are no precise economic rules set out in the Agreement as there are in the E.C.S.C. Treaty; and the institutions set up are restricted to the governmental plane, with no quasi-federal elements.

The Agreement provides for two institutions. The first is a Standing Council of Association, consisting of four British representatives[2] and of four representatives of the High Authority. It is to have two Joint Secretaries and is to meet alternatively in London and Luxembourg. Its task is to 'provide a means for the continuous exchange of information and for consultation in regard to matters of common interest concerning coal and steel and, where appropriate, in regard to the co-ordination of action on these matters' (Article 6). In this task it is to have regard to: (i) the interests of consumers, as well as coal and steel producers, (ii) the interest of third countries, and (iii) Britain's special Commonwealth links (Article 9).

In addition, the Council of Association is given two particular tasks on trade restrictions. Firstly, if either party contemplates introducing *new* restrictions affecting U.K.-Community trade in coal or steel in order to meet situations of over-production or shortage, the matter must be referred to the Council of Association beforehand (or as soon as possible afterwards), in an attempt to secure co-ordinated action in both markets and to encourage mutual assistance. Secondly, the Council of Association shall, at the request of either side, examine *existing* restrictions limiting U.K.-Community trade in coal or steel (e.g., quotas, tariffs, exchange controls, dumping and anti-dumping measures, export subsidies, etc.), with a view to making agreed proposals for their reduction or elimination. The first such examination is to be completed in time to be considered by the Community countries when reviewing their tariff position before the end of the five year transitional period provided in the E.C.S.C. Treaty (i.e., in 1958).

[1] See *Agreement concerning the relations between the United Kingdom and the European Coal and Steel Community*, Cmd. 9346, 1954.

[2] An exchange of letters on December 21st, 1954, provided that the four U.K. representatives would normally include a Minister, one member of the N.C.B., and one member of the Iron and Steel Board.

The Council of Association provides for meetings between Britain and *the High Authority*, representing the Community as a whole. The second institutional provision of the Agreement arranges for special meetings of the E.C.S.C. Council of Ministers, at which British representatives may negotiate directly with the *separate governments* of the six Community countries. These special meetings may discuss any matters which the E.C.S.C. Treaty reserves for member Governments or the Council of Ministers. Subjects to be discussed must be sent for prior examination to the Council of Association, and the High Authority has the right to participate fully in the special meetings of the enlarged Council of Ministers.

The matters of 'common interest concerning coal and steel' which are to be the concern of the Council of Association are defined as follows (Article 6 (2)).

(*a*) Conditions of trade in coal and steel between the Community and the U.K.
(*b*) Supplies of coal and steel.
(*c*) Raw material supplies for the coal and steel industries.
(*d*) Pricing arrangements and factors affecting the price structure (except wages and working conditions).
(*e*) Market and price trends.
(*f*) Development and investment policy.
(*g*) Trends of production, consumption, exports and imports.
(*h*) The effects of new sources of energy and substitute materials on coal and steel requirements.
(*i*) Technical developments and research.
(*j*) The safety, health and welfare of the workers.

The Council of Association may not discuss matters which fall outside the scope of the Community Treaty.

In summary, the Agreement provides for a Council of Association, representing the U.K. and the High Authority, which is to cover a fairly wide list of subjects on which it may (i) exchange information, (ii) consult, and (iii) 'where appropriate', co-ordinate action. In addition, this body has the right to be consulted before trade restrictions are *increased*, and it may also examine existing restrictions with a view to securing agreed *reductions*. There is also to be a special Council of Ministers for discussions between the seven Governments concerned on matters outside the High Authority's competence.

If one is to criticize the Agreement, it must be on points on which the economist *qua* economist has no special competence. Clearly, the Agreement must appear quite inadequate to those who believe strongly in the development of European Unity along federalist

lines, and who see in the European Coal and Steel Community the first major step to that political end. Equally, the Agreement may appear as a potentially dangerous 'thin end of the wedge' to those who regard all Continental connections as anathema. But the economist as such has little to say about the Agreement as it stands because it has only a limited economic content. The way in which economic association between Britain and the Community will develop is almost as open a question now as it was before the Agreement was signed.

In attempting to review and assess the economic issues involved in our association with Schumania, we must, therefore, range beyond the narrow limits of the text of the Agreement. The list of 'matters of common interest' set out in Article 6 (2) and summarized above does, however, provide us with a useful framework for our discussion. The rest of this paper will seek to examine these points in turn and endeavour to suggest the desirable course and extent of co-operation on each, paying regard to the institutional framework as set by the Agreement and by the respective powers possessed by the High Authority on the one hand and the British Government, the N.C.B. and the Iron and Steel Board on the other. The discussion will, in large measure, be confined to the 'steel half' of Association.

CONDITIONS OF TRADE BETWEEN E.C.S.C. AND THE U.K.

'The mission of the European Coal and Steel Community is to contribute to the expansion of the economy, the development of employment and the improvement of the standard of living . . . through the creation . . . of a common market.' That statement in Article 2 of the Community Treaty is more than a flowing phrase in a preamble: the belief that a wider free market is essential to the economic progress of Western Europe is a primary article of belief in High Authority circles. It is understandable, therefore, that 'the reduction, or if possible, the elimination' of all tariff, quota and licensing barriers limiting the free flow of coal and steel between Britain and the Community should have been the main point in the High Authority's letter of December 24th, 1953, and that the 'conditions of trade in coal and steel between the Community and the U.K.' should have been put as the first point of common interest in the Agreement.

We must, therefore, expect continuing pressure from the Community designed to secure a completely free flow of coal and steel between our respective home markets, and this will force us to review very carefully our existing protectionist policies towards both the coal and the steel industries. Indeed, it is at this point more than

any other that the British Government have given ground in the Agreement. Formally, Article 7 commits us to no more than prior consultation on contemplated new restrictions on trade in coal and steel, and leaves us still free to impose such restrictions at our discretion if no agreed policy is evolved. But, in practice, this provision may have an important indirect effect on Ministerial thought and action. Ministers may well be more reluctant to introduce new trade restrictions if they are aware that they will be required to justify them before a body whose question will be, not 'Is this good for Britain?', but 'Is this good for Europe?' It may be held, of course, that we *should* decide our policies on the basis of what is good for Europe: that is beyond the scope of this article. All we are concerned here to do is to notice that Article 7 introduces a new anti-protectionist factor into the balance of policy-making. Moreover, Article 8, which provides for the examination by the Council of Association of all existing restrictions, is even more important in this respect. It specifically provides that the examination is to be made 'with a view to making such proposals for their *reduction or elimination* as may be agreed for the mutual benefit of the Community and the United Kingdom' (my italics). Clearly, here again, a weighty anti-protectionist factor is introduced.

As far as steel is concerned,[10] the British reaction will be affected by an assessment of the competitive strength of the steel industry. It is impossible directly to compare cost levels in the British and Community steel industries since cost information is rarely released. But it is possible to make a comparison of home trade prices, and these may be taken as a fair first approximation to comparative costs. Table 1 shows that for a number of representative products, the U.K. home trade prices are, in every case, below the lowest corresponding Community prices, even though the French and Belgian prices relate to lower quality Bessemer steels.

Although long-term cost comparisons are inevitably speculative, an examination of the main cost elements does not reveal any sector in which the U.K.'s present comparative cost advantages are likely to be markedly weakened in the next decade, especially in view of the industry's heavy investment since the war and the continuing programme contained in its Second Development Plan.

[10] In the case of coal, the removal of market barriers would raise extremely serious problems. While estimates differ, it is clear that demand is likely to press hard on fuel supplies in Britain over the next few decades, and that coal will remain the main source of energy. Any substantial diversion of coal supplies to foreign consumers, therefore, might well limit the rate of industrial expansion and possibly even endanger full employment. For this reason alone, it seems improbable that Britain could agree to remove all barriers between the U.K. and the E.C.S.C. coal markets: moreover, other considerations on the price side tend in the same direction.

British steel producers should, therefore, be able to hold their own on their merits in the U.K. market, especially in view of the automatic protection given by transport costs. The danger of a massive flood of imports from Schumania would seem to be small, given fair trading conditions. What would be likely to come about in an open

TABLE I[11]

Home Trade Price Comparisons, U.K. and E.C.S.C., August, 1954

Product	U.K. Price			Lowest E.C.S.C. Price				Product	U.K. Price			Lowest E.C.S.C. Price			
				Country								Country			
	£	s	d		£	s	d		£	s	d		£	s	d
Angles	29	7	0	Belgium	32	16	0	Bars	32	11	0	Belgium	33	2	6
Joists	29	8	0	,,	32	6	0	Strip	33	13	0	,,	36	13	6
Plates	33	4	0	,,	39	3	0	Sheets	41	11	0	France	49	2	0
Rails	30	5	0	France	36	3	0	Tinplate (per basis box)	2	18	10	,,	4	3	4

(The prices quoted are for particular sizes and qualities. U.K. open hearth quality: France and Belgium, Bessemer quality. The extra for open hearth quality is £3 a ton in France and £4 a ton in Belgium.)

market would be a fairly small but useful interchange of goods. The Community might take from Britain some 100-200,000 tons of specialized products, such as ship-plates of open-hearth quality. The U.K. in return might import marginal quantities designed to meet the peaks of demand for certain products where the expansion of production is slow or inadvisable.[12]

On this basis, it might appear that we could now afford to meet the Community over their main demand and remove existing tariff and licensing barriers on steel. First, however, three further factors must be considered.

[11] The Second General Report of the High Authority, April 1954, pp. 66-68, states that the lowest home trade prices in the Community are 'in the case of many products (billets, sheet bars, wire rods), lower than those of British producers'. The comparisons made are, however, somewhat misleading. (i) The lowest current price in the Community may apply to only one producer, whereas the British home trade price is, by and large, applicable to most inland sales. (ii) Basic Bessemer quality in the Community is being compared with open hearth quality in Britain: the extra for open hearth quality in France and Belgium is about £3-4 a ton. (iii) The comparison is in terms of basis prices: Community extras for size and for small quantities are considerably larger than ours, while the fairly widespread British practice of giving allowances on certain sizes and on large orders is rarely followed in the Community. (iv) The Community's comparison is on an ex works or basing point basis; while hardly affecting the relativity of British, German and Belgium delivered prices, this basis gives an unduly favourable impression of French delivered prices, since the average carriage cost per ton of steel is probably twice as high in France as in Britain.

[12] The Iron and Steel Board's report, *Development in the Iron and Steel Industry, 1953-58*, para. 23, assumes that while there may 'be relatively small quantities of steel which it is desirable to import', these should not exceed 100,000 tons a year by 1958.

(a) *Protection against 'dumping'*

'Dumping' is a particularly important issue in the steel industry, both theoretically and historically. Firms in all industries seek to continue operating in bad times, even at an overall loss, so long as they can obtain some contribution towards the burden of inescapable fixed costs, that is, so long as price exceeds variable cost per unit of product. In the steel industry, however, the fixed-total cost ratio is very high. Thus the gap between total and variable cost per unit, which sets the range of possible price cutting, is particularly large, and the opportunities for below-cost dumping are correspondingly great.[13] This is especially so for sales in foreign markets, partly because here formal or informal restraints on unfair pricing practices are less, and partly because tariff protection effectively divides the total market and so provides one of the theoretical conditions in which revenue can be maximized by price discrimination.

It was, indeed, systematic dumping by Continental producers which led to the introduction of the U.K. tariff on steel in 1932. In 1931, German plates were selling at 82s. a ton, f.o.b. Antwerp, as against their home trade price of 151s. a ton, f.o.t. Essen, and total steel imports into the U.K., at 2.8 mn ingot tons, accounted for almost half of the total U.K. home consumption of steel, at 6.1 mn ingot tons. Recent experience has indicated that Community steel producers are still operating a much more flexible price policy abroad than at home, and it seems not unreasonable for the British steel industry to require that some form of safeguard be provided against dumped imports in any future recession.[14]

It has been suggested that this safeguard, which is now provided by tariffs and import licensing, might be secured for the future by an agreement with Schumania on common pricing rules, on the lines of those currently in force inside the Community. Each U.K. producer would then be required to quote his prices in relation to some basing point, and would thereafter have to stand ready to supply any U.K. or E.C.S.C. consumer at that price, plus 'extras' and transport charges, without any price discrimination between consumers on the ground of nationality: and similarly for Community

[13] The high fixed-total cost ratio also means that the burden of fixed costs is very heavy at low rates of output. Hence steel producers are often anxious to maintain high capacity working at all costs, even if that involves 'dumping' abroad. See James A. Morris, 'The Concept of Steel Capacity', *Journal of Industrial Economics*, December 1954, for comments on the American experience.

[14] The increased danger of American dumping of steel must also be considered. The shift of many steel producers to the Eastern seaboard has increased the tendency to look outwards, and there might be a tendency to dump overseas in order to maintain high capacity working in a depression. Experience in the 1954 recession, however, did not bear out this fear: see British Iron and Steel Federation Bulletin, *U.S. Steel in Recession*, November 1954, p. 11.

producers. If these pricing rules were strictly applied, they would prevent dumping altogether, although at the cost of a complete upheaval in the U.K.'s pricing and marketing arrangements. The danger is that, whereas the enforcement of tariff and import licensing safeguards is wholly within our own control, enforcement of these pricing rules would not be. Events in the Community in the autumn and winter of 1953-54, when sales far below published price lists became widespread, emphasized the possible gap between the High Authority's desire to enforce its regulations and its ability to do so. Although there has been some improvement in the past twelve months, this improvement seems to have been associated as much with an easing of market pressures as with a tightening of the High Authority's control techniques. Evidence to date casts doubt on the High Authority's ability to enforce pricing rules against the short-run interests of member firms in a recession. Such rules would not seem to provide a sure safeguard against dumping. It would appear necessary, therefore, to continue to rely on the tariff, at least in times of depression.

(b) *Commonwealth Trade and Preference*

The second factor to be considered is the effect of relaxations in the British tariff on Commonwealth trade in steel. Table II shows the considerable importance of the Commonwealth market to British steel exporters.

TABLE II[18]

U.K. Steel Exports
(.000 tons)

Year	1913	1924	1929	1937	1950	1951	1952	1953
Commonwealth	2011	1590	1858	1128	1525	1184	1231	1195
Other Countries*	2419	1823	1982	1130	1071	943	833	1008
Total	4430	3413	3840	2258	2596	2127	2064	2203
Commonwealth percentage	45	47	49	50	59	56	60	54

* Eire and Burma included in Commonwealth, 1918-37, and in Other, 1950-53.

Clearly, it is vital during negotiations with E.C.S.C. to avoid any changes which might weaken our advantageous position in Commonwealth markets. Such interference might arise in any of three ways:

(i) Any reduction or elimination of U.K. tariffs in favour of E.C.S.C. would necessarily reduce or remove the value of the

[18] Source: British Iron and Steel Federation Bulletin, *Imperial Preference and British Steel*, August 1954, p. 9.

preferences which we give to Commonwealth steel producers. Although such preferences have a limited value, this might provoke retaliatory cancellations of the valuable preferences granted to U.K. producers in the countries affected.

(ii) It might be even more damaging if tariff negotiations opened up opportunities for Schumania to offer reciprocal preference arrangements to the Commonwealth. Even in face of our present tariff advantages, the Community supplied almost half of the combined U.K.-E.C.S.C. sales to the Commonwealth in 1951-53.

(iii) Article 79 of the Community Treaty requires each member State to extend to all others any preferential advantages which it enjoys in its oversea dependencies. The Community might press for this Article to be included in the Association Agreement at some future stage.

The overwhelming importance of Commonwealth markets to British steel exporters weighs heavily in favour of extreme caution when considering changes in British steel tariffs.

(c) *The Importance of Indirect Steel Exports*

Since the war, the main weight of Britain's export drive has come increasingly to be borne by the engineering, vehicle and other metal-using industries[16] as Table III shows.

TABLE III[17]

Steel Consuming Industries' Exports
(£ million)

Year	1938	1949	1950	1951	1952	1953	1954
(1) Steel consuming industries' exports	125	760	905	1039	1125	1114	1157
(2) Total U.K. exports	471	1787	2174	2582	2584	2582	2673
1 as percentage of 2	27.0	42.5	41.6	40.3	43.5	43.1	43.3

All of these industries use steel in large quantities. The calculation of the amount of steel delivered to these industries which goes to export is fraught with some difficulty. Table IV, must, therefore, be regarded with caution in its details, but the broad picture presented is correct.

[16] The categories concerned are: manufacture of metals; machinery, excluding electric; electric machinery, apparatus and appliances; railway vehicles; road vehicles and aircraft; ships and boats; and scientific instruments, etc.

[17] British Iron and Steel Federation Bulletin, *Steel for Indirect Export*, November 1954, p. 9.

TABLE IV[18]

Indirect Exports of Steel
(.000 finished tons)

Industry	1953	Industry	1953
Motors, Cycles and Aircraft	820	Hardware, hollow-ware, etc.	120
Mechanical Engineering	780	Constructional engineering	120
Shipbuilding & Marine Engineering	320	Chains, Nails, Screws, etc.	70
Electrical Machinery and Goods	150	Other industries	80
Railway Rolling Stock	150		
Wire and Wire Manufacturers	170	Total	2980
		Total—million ingot tons	4.10

The connection between the steel used in any export good and the final cost of that good varies considerably between products. Table V, which shows the selling value of certain exports per ton of finished steel content, illustrates this variation, in reverse.

TABLE V[19]

Selling Value per Ton of Finished Steel[*]

Product	£	Product	£
Fabricated sections and structures	80	Road vehicles	380
Wire, etc.	90	Machinery (excl. marine)	500
Hardware, hollow-ware, etc.	140	Electrical goods	2150
Ships, marine engines, etc.	170	Aircraft and parts	3400

Weighted average = £400

[*] Based on 1953 quantities and values.

If we express steel costs as a percentage of selling prices for a variety of metal goods industries a similar variation is found, ranging from 32 per cent for wire and wire manufacturers, to 14 per cent for mechanical engineering, and down to 2 per cent for scientific instruments.[20] In other words, a 10 per cent advantage over the prices which foreign competitors have to pay for their steel would allow price advantages of £3 4s., £1 8s., and 4s. respectively per £100 worth of finished goods in these three industries. Despite this wide range, however, it is probably true to say that for all except the most highly processed articles, such as scientific instruments, the relative cheapness of British steel as against the steel obtained by metal-using export industries in the Community is an important element in the ability of our metal goods to compete in world markets.[21]

The removal of all barriers to the free flow of steel between British

[18] Ibid., p. 10. [19] Ibid., p. 9. [20] Based on 1948 *Census of Production*.

[21] The volume of Continental complaints against the so-called 'hidden subsidies' given to British exporters through the medium of low coal and steel prices is some measure of the importance given to this factor by foreign competitors. See pp. 101-2 below.

and Community markets would inevitably serve to reduce or remove this source of export advantage. If British steel prices remained unchanged, below Community prices, there would be an outflow of British steel to Community users and the British metal goods industries would suffer from shortages of supply. If British prices increased towards the Community level to prevent such an outflow, home users of steel would lose the cost advantage hitherto enjoyed — an advantage ranging from 11s. 6d. to £7 11s. a ton, as Table I shows.[11] In practice, both changes might be expected to ensue, with the equilibrium result being somewhat higher steel prices and rather greater difficulty in securing supplies.

The engineering, vehicle and other metal-using industries have, therefore, little to gain from a unified U.K.-E.C.S.C. market, and much to lose. In the inter-war years, this was not so. In the early 1930s, Continental dumping of steel products made a free trade policy attractive to some independent re-rollers and steel users, who were thus enabled to get cheaper steel from Continental sources — albeit at a heavy cost to the home steel industry. But nowadays, with Continental steel costs definitely above British costs, no such advantage could arise under fair trading conditions, and there is little chance that the Government would be prepared to allow a renewal of wholesale below-cost dumping on the British market.

Even ignoring the wishes of steel *producers*, and regarding policy solely from the standpoint of steel *consumers* in this country, there remains a strong objection to the creation of an open market. And that objection is upheld when national export policy is taken into account. An economy which is becoming increasingly dependent for its essential imports on its capacity to sell metal goods in highly competitive world markets cannot afford lightly to throw away an important source of cost advantage in these products.

We suggested earlier, after reviewing the comparative cost position of U.K. and Community steel producers, that it might appear that we should have little to fear from a removal of the tariff and other barriers protecting the U.K. market. But when policy is reconsidered in the light of these further three factors — the threat of dumping, the importance of Commonwealth trade, and the effect on metal goods exports — the balance of advantage would seem to lie *against* any withdrawal of the tariff on steel.

[11] In the case of coal, the same dangers would exist. But in view of the expected long-term tightness of coal supplies in Britain, the main effect on home coal users might be on the supply side, whereas the main effect on home steel users would be more probably on the price side. This is especially true if attention is directed to particular key types of coal.

The Agreement, however, appears to commit the British Government to considering some measure of relaxation, and three possible courses may be mentioned. Firstly, we might continue the present tariff, but extend the practice of Suspensory Orders, exempting from duty those products which we wished from time to time to import. This, however, involves constant uncertainty, is administratively clumsy, and could come near to being a variant of import licensing in certain circumstances and so meet opposition from G.A.T.T. Secondly, we might devise some type of 'double-decker' tariff, similar to that which operated in the late 'thirties, with a high protective rate for most imports but with a specified quota admitted at a lower rate. Even if sizeable imports were desired, G.A.T.T. would again present difficulties. Such a 'double-decker' tariff could be admissible under G.A.T.T. only if the allocation of the lower-deck quota was non-discriminatory,[13] and it would be difficult to present such an arrangement as both non-discriminatory and yet a concession to the Community. Thirdly, we might reduce the general rate of duty as a whole and supplement it by provision for anti-dumping duties.[14] This would have the advantage of meeting the criticism of the high protective tariff, both at home and abroad, and yet would provide a barrier against unfair competition and dumping. Article 74(1) of the E.C.S.C. Treaty already permits protective action of this nature in the event of dumping in the Community by non-member States, so the High Authority could not reasonably object to a similar reservation by Britain. On the whole, this final course would appear the best.

SUPPLIES OF STEEL

The Agreement mentions 'Supplies of coal and steel' as one of the matters of common interest on which the Council of Association may exchange information, consult, and possibly recommend common action. Beyond that, however, it says little, and in order to judge what may be in the mind of the High Authority, we must have recourse to the outline of proposals in M. Monnet's letter of December 1953, and to the provisions of the Community Treaty.

In normal market conditions, when the supply of and demand for steel are reasonably in balance, both the Community and the British systems leave individual firms free to decide their own production policies in response to market pressures. The High Authority has the duty to 'see that the common market is regularly supplied'

[13] Article XIII, Section 2, General Agreement on Tariffs and Trade.
[14] Article VI, G.A.T.T. The additional rate of duty may equal the amount by which the offer price of exports falls below the home trade price (Article VI (2)).

(Article 3a, E.C.S.C. Treaty), but the Treaty requires that, 'In the field of production the High Authority shall give preference to the *indirect* means of action at its disposal' (Article 57). Similarly, the U.K. Iron and Steel Board has the general duty to promote 'the efficient, economic and adequate supply under competitive conditions of iron and steel products' (Section 3 (i), 1953 Act), but the qualifying phrase 'under competitive conditions' clearly establishes the general freedom of producers in normal circumstances. When the market is reasonably in balance, therefore, the activity of the Council of Association is likely to be confined to the exchange of information and periodical reviews of the market situation, and there is no reason to envisage any clash of views over control of production policy.

As regards abnormal market conditions, however (i.e. when there is either serious over-production or shortage), the High Authority's wishes are uncertain. The Monnet letter proposed, in regard to 'such actions as temporary measures designed to deal with the difficulties of the markets', that the party contemplating action should first consult with the other, and should not take unilateral action until attempts to agree on a common policy had failed. In the Agreement, this proposal is not repeated explicitly: but Article 7 might possibly be invoked in the event of the introduction of production quotas or allocation schemes in Britain on the ground that such schemes would indirectly involve the 'additional restrictions upon trade in coal or steel between the Community and the U.K.', which are the primary concern of this Article. Article 7 requires the party envisaging new restrictions on external trade, designed 'to meet difficulties arising from a decline in the demand for coal or steel or from a shortage of supplies, actual or anticipated', to bring the matter before the Council of Association.

The Monnet proposals and (possibly) Article 7 of the Agreement would seem to commit Britain only to consultation on production policy at times of market difficulty, and to preserve her freedom of action in the last resort. As such, they are acceptable. But there are some signs that the High Authority would like to go further and to bring production policy at times of over-production or shortage within the scope of jointly-agreed rules, on the lines of those now applicable within the Community.[11] It may be useful, therefore, to outline what these rules would involve and to consider what the British attitude should be.

[11] See M. Monnet's letter of 23.12.53: 'It is natural that the High Authority should, for its part, seek these (Common Rules) along the lines of those provided for in the Treaty constituting the Community'. (Cmd. 9147, p. 6.)

At present, in the event of a fall in demand within the Community which cannot be corrected by indirect action, the High Authority may declare a state of 'manifest crisis'. It can then, after discussions with the Consultative Committee and with the concurrence of the Council of Ministers, institute production quotas. These quotas, it seems, would be expressed as a percentage of output in a given base period, and levies would be charged on all excess production to maintain employment in firms or pits producing less than their quotas.

The main objection which has been advanced from the British side against granting similar powers to the Council of Association springs from the belief, strong in trade union circles, that Britain is more likely to maintain a full employment level of activity than are certain of the Community countries. If Britain maintained a heavy demand for coal and steel but a deficiency of demand appeared in the Community, such rules might lead to the diversion of British orders to Community producers while British pits and steel-works were forced into part-time working within a production quota. In the absence of any co-ordinated full employment policy for both economies, acceptance of quota rules for periods of declining demand might mean that the British coal and steel industries would be required to bear burdens of re-adjustment which should properly be borne by the Community's economy as a whole.

In the event of a shortage of coal or steel within the Community, the High Authority may, unless the Council of Ministers unanimously disapproves, propose an allocation scheme. On this basis, the Council — if it can reach unanimous agreement — may allocate the scarce products between the coal industry, the steel industry, other home consumers and exports. Failing unanimous agreement in the Council of Ministers, the High Authority may allocate the scarce products between the member States on the basis of their past consumption and exports, leaving further detailed allocation to individual Governments. In the last resort, and with the concurrence of the Council, the High Authority may require all member States to restrict exports of the scarce products.

There would be strong objections to the grant of such powers to the Council of Association. These powers of allocation do not affect only the coal and steel industries: indeed, they affect those industries comparatively little. Their impact is rather on the industries consuming coal and steel, which means, in effect, on the whole economy. The fixing of priorities between consumers in the use of scarce materials involves key questions of economic policy. Is the engineering industry to expand at the expense of transport? Is agricultural

machinery to have priority over washing machines? Are export industries and investment goods industries to be given supplies and the domestic consumer kept short? These are issues of crucial importance which will be largely decided, in practice, by the body possessing the power to allocate coal and steel. To allow them to be settled by a joint U.K.-E.C.S.C. Council would involve a major derogation of sovereignty — and that, British policy has so far refused to accept.

Similar objections apply also on the export side. For example, in 1951, at a time of severe steel shortage, priority in British steel exports was deliberately given to Commonwealth consumers at the expense of foreign sales which might possibly have been more profitable or more useful from a narrow balance of payments viewpoint. If our allocation policy had then been subject to a joint body, half of whose members were not continuously and intimately concerned with Commonwealth links, the allocation of the U.K. steel supplies might have followed a different pattern, to the detriment of Commonwealth relations. The Council of Association is required by Article 9 to have regard to the special U.K.-Commonwealth connection, and this would be some safeguard in this field. But it provides no safeguard against interference with our position in other foreign markets to which we might also, for long-term commercial or non-commercial reasons, wish to give preferential treatment at times of shortage.

Once again, a decision against the acceptance of any formal commitment need not involve a wholly inflexible stand. It would be useful to both sides if it could be informally agreed that, at times of shortage, normal Community exports to the U.K. would be maintained as far as possible and that similar facilities would be granted by the British Government for normal Community requirements. Similarly, there would be advantages to both sides in a working arrangement to limit the competitive bidding-up of prices of imports from other areas in the event of concurrent shortages in both home markets.

RAW MATERIAL SUPPLIES

Excessive competition for foreign raw material supplies would injure both the U.K. and the Community, with no prospect of offsetting gains for either. The reference in the Agreement to an exchange of information and consultation on 'supplies of raw materials for the coal and steel industries' opens up a prospect of useful co-ordination of activities in this field.

(a) *Iron Ore.* Table VI shows the considerable extent to which Britain depends on imported ore:

TABLE VI

Sources of Iron Ore Consumed in U.K.*

Year	1938		1953		1954	
	.000 tons	%	.000 tons	%	.000 tons	%
Home Produced	11,715	73	15,950	63	15,338	59
Imported: E.C.S.C.	296	2	730	3	802	3
Other countries	4,068	25	8,654	34	10,021	38
Totals	16,079	100	25,334	100	26,161	100

* By tonnage of ore. In terms of Fe content, imported ore accounted for 46 per cent of iron ore consumed in 1953. The average metallic content of home ore is 28 per cent and of foreign ore is 57 per cent.

The planned increase in pig iron production under the 1953-58 Development Plan, from 11.2 million tons in 1953 to 15.15 million tons in 1958, will involve a further increase in U.K. requirements of foreign ore, despite the planned growth in home ore production. Assuming a proportionate rise in ore imports, these should be running at a rate of about 15-16 million tons a year by 1957-58, an increase of some 5-6 million tons over 1952. A major part of these increased supplies would probably have to come from Scandinavia, Labrador, Wabana and French Africa.

The Swedish ore expansion programme suggests that an additional 3 million tons will be available for export by 1958, while Norwegian ore exports should also be higher. Moreover, U.S. ore imports from Sweden (1952 = 2.1 million tons), will probably soon diminish. Scandinavia should, therefore, have an additional 5-6 million tons available for export to Europe by 1957-58. Even without any special U.K.-E.C.S.C. agreement, it seems reasonable to expect that Britain should get about half of the additional exports.

The factors limiting U.K. imports of Labrador and Newfoundland ore will be U.S. competition and transport difficulties. E.C.S.C. competition is unlikely to prevent our securing our desired share of the supplies available and no need for any special agreement is likely to arise from the British side.

As regards ore imports from French Africa, the position is somewhat different. Under Article 79 of the Community Treaty, the power of the High Authority extends only to the European territories of the member States. French Africa is, therefore, formally outside E.C.S.C. control. In the event of any serious shortage of ore, however, pressure might well be brought to bear on the French Government to divert supplies from its African territories to its fellow members in the Community. Indeed, it is reported that Italy gained prior guarantees of North African ore supplies as part of the price for

her entry into the Community, and the possible implications of Franco-German economic co-operation in the development of the French Union, discussed concurrently with the Saar Statute in October 1954, must also be borne in mind. Here, Britain has two safeguards: the political improbability of French discrimination against Britain and in favour of Germany; and our substantial financial interest in the development of the French African ore fields. Nevertheless, an assurance by the Community that they will not seek to interfere with our share of French African ore supplies would be welcome.

(b) *Scrap.* The Second Development Plan foresees an increasing reliance on pig iron as the principal steel-making raw material and a rising pig iron-scrap ratio. Considerable progress has already been made.

TABLE VII

Pig Iron-Scrap Ratio in British Steel-making

	1920	1930	1946	1951	1954
Pig iron consumed per ton of steel (cwts.)	12.84	9.99	9.60	9.97	10.55
Scrap iron consumed per ton of steel (cwts.)	8.78	11.12	12.05	11.67	11.11
Pig iron–scrap ratio	62/44	50/56	48/61	50/58	53/55

If we assume that a pig iron-scrap ratio of about 58/50 is achieved by 1958, the planned steel output of 22 million tons would require 11 million tons of scrap, which can[16] almost certainly be covered by home arisings. Towards the end of this decade, therefore, Britain should be largely independent of foreign scrap, although programmes are sufficiently flexible to take advantage of any cheap foreign scrap which may become available. The Community should also be in balance as regards home scrap supplies and requirements.

If any pressure is exerted by the Community in this sector, it is likely to be directed at the British pricing policies on scrap. At present, scrap exports are forbidden and the Government sets maximum prices for home purchases. The Government, scrap merchants and steel industry have all consistently taken the view that stable prices for scrap, maintained over long periods, ensure a regular flow

[16] The pig iron-scrap ratio is expressed, not as percentages, but as shares of the 'yield'. A yield of 108 (ratio, say, 58/50), means that 108 cwts. of pig iron and scrap are required to produce 100 cwts. of steel. Thus with a ratio of 58/50, 50 cwts. of scrap are required for a yield of 100 cwts. of steel, and so 11 million tons of scrap for 22 million tons of steel.

of scrap in the maximum quantities more effectively than would a fluctuating price policy. In a period of rising prices, this stabilization policy has tended to restrain U.K. scrap prices and the resulting cheap supply of scrap has been an important source of the British steel industry's competitive advantage vis-a-vis Community producers. Any opening of a unified U.K.-E.C.S.C. market for scrap, accompanied as it would have to be by a sharp increase in U.K. scrap prices, might well increase British steel-making costs by up to 30s. a ton, with adverse effects on exports of some metal goods.[37] Since the British steel industry will not depend on foreign scrap, it is difficult to see what advantages would accrue to Britain from the removal of barriers between the U.K. and E.C.S.C. markets for scrap which would in any way compensate for the adverse effects on steel costs.[38]

(c) *Coal and Coke.*[39] The steel industry is the largest user of energy in Britain and fuel costs account for about one-fifth of the price of heavy steel products. In 1953, the industry consumed some 13.9 million tons of coal for coking purposes, another 6.6 million tons for boilers, gas producers, etc., and bought from outside the industry coke equivalent to 6.2 million tons of coal.

As regards supplies, Britain is unlikely to require more than marginal imports. The steel industry is, however, already anxious about the long-term supply of good quality home-produced coking coals and any arrangement which might permit greater exports of these coals would excite concern. On the price side any move towards closer unification of the two markets would be likely to lead to substantial increases. Firstly, the opening of freer interchange between the markets would inevitably force a rise in British coal prices towards the Community levels to check any substantial outflow of coal. Secondly, Continental steel and engineering firms have long been complaining that the 'artificially low' level of home coal prices in Britain represents a hidden export subsidy for steel and metal goods, and the High Authority would come under pressure to secure U.K. prices of coal and coke nearer the Community level. And thirdly, there would certainly be heavy pressure for the abolition of dual pricing for Britain's coal exports, and an increase in home prices

[37] For most steel users, the higher price of steel would be partly offset by the additional receipts from the sale of scrap arising in their works: steel users are also scrap sellers. Industries with large arisings of process scrap as compared with their steel usage would gain. Others, e.g. shipbuilding, would lose.

[38] E.C.S.C. has examined a scheme for scrap levies and pig iron remissions on the U.K. model and its adoption might alter the position. The presence of stable scrap prices in Britain and of fluctuating scrap prices in the Community would still create problems, however.

[39] In large measure, this section is confined to discussing coal and coke only as raw materials for the steel industry.

might well be required to restore the N.C.B.'s finances in face of the loss of export premiums.[30]

There is little to be gained in trying to estimate the size of any possible increase in home coal and coke prices if intercourse between the two markets was made freer: too much depends on the particular nature and extent of the measures taken. It may be noted, however, that the average increase of 2s. 10d. a ton on coal in May 1954, added some £6.25 million to steel-making costs; and the increases resulting from closer association with Schumania might well be nearer 10s. a ton on average.[31] Once again, any substantial lowering of barriers would seem to involve appreciable disadvantages for the steel industry and to offer few gains.

On the whole, then, although there is advantage to be gained from consultation and a wide exchange of information on raw material supplies, in particular on ore supplies, the balance of consideration seems heavily against any closer unification of the two markets, especially in the case of scrap, coal and coking coal.

PRICING POLICY

The Agreement includes, as a matter to be considered by the Council of Association, 'Pricing arrangements and factors affecting the structure of prices, including subsidies, but not including those questions which are normally the subject of negotiation between employers and employees.' In the event of any extension of the Council of Association's discussions beyond the simple exchange of information, four questions may arise.

(a) *The Pricing System.* There are marked differences between the pricing systems used in the British and the Community steel industries.[32] Britain operates a zonal delivered price system, except for rails and tinplate. In many cases, however, one zone covers the whole country, while in others the 'zonal extras' are small, so that the system approximates to a uniform delivered price system. The

[30] In 1953, the N.C.B. received an average of about 76s. a ton for exports, as against some 61s. a ton on the home market. With exports at 16.6 million tons, this meant extra receipts of £12.4 million. Since the coals exported were largely special coals whose prices are above the average, the real gain was probably somewhat less. Export premiums have fallen in recent years as world supplies have improved.

[31] Coke price comparisons are very difficult. For example, although the pithead price of large hard coal in Germany is substantially above the British level, coking coal prices approximate more closely to the general level of coal prices than in Britain. In the case of coke, the gap is further reduced since Community coke producers receive substantially higher prices for gas and other by-products and can thus reduce their coke prices.

[32] In the coal industry, the change to the Schuman pricing system would be even more difficult than in steel. Factors relevant here include single ownership; the statutory duty to 'break even' over a period, which implies the presence of profits on low cost pits and of losses on high cost pits; and the considerable degree of averaging of costs between pits and areas.

Community operates a multiple basing point system, with forty-one authorized basing points. Prices are published f.o.t. basing point and the consumer bears freight charges. A steel firm may, however, 'align' its delivered price on that of a competitor working from a basing point nearer the consumer, so that some measure of freight absorption is possible.

The change from a uniform delivered price system to the Community's multiple basing point system has been made by both Belgium and Luxembourg. If urgent need arose, such a change could probably be made in Britain also. Individual pricing would be impracticable while price control remained, but an area ex-works price system, with area price differentials reflecting differences in area average costs, would provide a close approximation to the Community system. Some change of this nature was discussed by implication in the final Report of the Steel Consumers' Council, which recommended the matter to the attention of the incoming Iron and Steel Board. On balance, however, the present zonal delivered price system has advantages not lightly to be abandoned, and the differences between the U.K. and the Community pricing systems must present a serious obstacle to closer market integration.

(b) *Price determination.* Here, also, marked differences exist between Britain and the Community. In Britain, maximum prices are fixed for most steel products by the Iron and Steel Board, on the basis of costing principles developed from 1937 onwards. Pig iron and primary steel producers submit regular statements of their costs and realized prices for each of their main products, and similar information is collected quarterly from a large sample of firms producing more finished products. In addition, each of the firms costed supplies an annual statement of total profits. On the basis of its knowledge of the level and spread of costs and of the final returns on capital, the Iron and Steel Board fixes what it considers to be fair prices.[33]

In the Community, the High Authority has no power to fix prices, except in abnormal circumstances,[34] and price determination is left entirely to the firms, working within a competitive market framework. Once a firm has fixed its prices, however, it has to publish them in detail, and must thereafter stand ready to supply any consumer within the common market, without discrimination, at a price equal

[33] The prices are not set so as to cover the costs of all firms: losses are seen as a way of forcing improvement on the less efficient producers. See British Iron and Steel Federation Bulletin, *Organisation in the Steel Industry*, October 1948, p. 3: and *Planning and Competition in Industry*, August 1949, p. 9.

[34] Article 61 (a) allows the High Authority to fix maximum prices in face of shortages or the danger of monopolistic exploitation. Article 61 (b) allows it to fix minimum prices at times of over-production.

to its published price plus transport charges from its basing point. If a firm wishes to alter its prices, it is quite free to do so; but if so, it must formally amend its published price list, so that the concession is available to all, without discrimination. The firm, in other words, is able to adjust its price to meet changes in general market conditions, but it cannot do so to meet the peculiar conditions of any individual transaction.[35]

There is, here, a fundamental clash of concepts. The Community believes that steel prices can best be controlled by the ordinary pressures of the free market. Price determination is left to the firms, which are free to respond as they see fit to market forces, while the High Authority is concerned solely to ensure the maintenance of a competitive market framework so that the classical market pressures can really operate. In Britain, on the other hand, current practice has grown up empirically, largely conditioned by the danger of excess competition and 'dumping' in the inter-war years. The view has been taken that in the steel industry, uncontrolled competition is likely to be mutually destructive.[36] There is, it is held, a need to balance competition between firms with some form of central co-operation for the industry as a whole: it was with this view in mind that the Government made the grant of the 1932 tariff conditional on the creation of the British Iron and Steel Federation. The creation of a central organization, however, involves the potential danger of monopolistic abuse. Therefore, the argument runs, the industry must be subject to a national supervisory body, with power to fix prices: in turn, there has been the pre-war Import Duties Advisory Committee, the wartime Iron and Steel Control, the 1946 Iron and Steel Board, and now — after a deviation via nationalization into another theory — the 1953 Iron and Steel Board.

In the Community, there is free competition, plus an authority to ensure — albeit artificially — the maintenance of the free market framework. In Britain, there is a balance between competition, co-operation and control, with but few aspects of the free market pricing system. Moreover, Britain has followed a policy of price stability,

[35] From February 1954, firms were allowed to diverge slightly from their published prices without amending their price lists, so as to meet small day to day market shifts, provided that their averaged realized price was not more than 2½ per cent above or below their published price in any 60 day period. In December 1954, however, the Community's High Court allowed an appeal against this concession, on the ground that it contravened the clauses of the E.C.S.C. Treaty, concerning the publication of prices.

[36] E.g. the importance of the fixed cost element in prices makes firms anxious to maintain high capacity working at almost all costs, while the high fixed-variable cost ratio gives wide scope for below-cost selling. Again, the heavy cost of plant and the length of time required for installation makes quick adjustment of production to demand changes extremely difficult. And so on. There are factors particular to steel however, and to a few similar industries. The argument is not an attack on the free market system as such, over the whole economy.

restraining steel prices in the boom and checking price reductions in the down turn, whereas the Community, while deprecating the wide fluctuations previously in vogue on the Continent, permits steel prices to follow short-run market trends much more closely. Even if the two parties were anxious to enter into the closest possible link, it is difficult to see how they could reconcile such sharply differing viewpoints on the basis of price determination.

(c) *Export Prices.* Assuming that the two pricing systems remain separate, it would still be possible for Britain and the Community to agree to sell to each other at home market prices (plus transport charges). The Community would probably press this more particularly in the case of coal, but the issue arises also with steel.

Although export premiums have fallen appreciably in the past three years,[37] they still remain considerable. They range (at February, 1955) from about £4 a ton in the case of certain light re-rolled products, such as angles and flats, up to over £6 a ton for sheets, and to just under £11 a ton for tinplate. Indeed for some products, there has been an upward trend in recent months. Nevertheless, the improvement in world supplies has probably already squeezed out any true premium element in export prices, and what remains should be regarded as 'home discounts' arising from the British policy of stabilizing steel prices over a long period.

The cost of an offer to sell to the Community at home trade prices need not be great. Receipts from Community trade form only 5-10 per cent of the steel industry's export earnings, and the export premiums involved may well decline in any case. The indirect effects of such a move might, however, be more costly, since it would thereafter be extremely invidious to maintain premiums in other markets, especially in the Commonwealth. We might eventually lose all export premiums, at a total cost of £15-20 million a year.

(d) *Factors affecting Prices, including Subsidies.* The Agreement provides that the Council of Association may discuss, not only pricing arrangements, but also 'factors affecting the structure of prices, including subsidies'; wages and working conditions, however, are specifically excluded from this review. Two factors underlie the Community's attitude here. On the theoretical level, the Community Treaty is very concerned to ensure the maintenance of a competitive market structure, and gives the High Authority wide powers to remove factors tending to distort normal cost relationships in the coal and steel industries. On the practical level, there have been

[37] For example, the export premium on medium plates has fallen from £21 10s. a ton in July 1952, to £6 10s. a ton in February 1955. The premium on re-rolled angles has fallen from £19 to £4 in the same period.

repeated complaints by coal and steel consumers in the Community that the low coal and steel prices and wages in Britain represent a hidden subsidy to British exports.[28]

The Community Treaty distinguishes four categories of price-distorting factors:

(i) *Monopolistic agreements and amalgamations.* Here, the High Authority has proceeded cautiously. It is still involved in discussions with the cartels, and its policy in the event of a failure to reach agreement is not yet clear. No action to extend the powers of the Council of Association is likely in this field, at least for the time being.

(ii) *Discriminatory transport charges.* Here, the High Authority has acted with vigour. Many examples of gross discrimination against international traffic were quickly removed, and the agreement reached on through rail tariffs in February 1955, will remove the burden of 'interruption of charges' at frontiers. Freight charges between Britain and the Community, however, involve different problems, including agreed shipping freights and varying dock charges. In this field, early action will necessarily be limited to fact-finding studies, but there is no reason to suppose that Britain would be unwilling to amend any cases of freight discrimination discovered.

(iii) *State action.* Article 67 of the Community Treaty gives the High Authority wide powers to act against State interventions which upset the normal price structure in the coal and steel industries, whether by imposing burdens (e.g., discriminatory taxes), or by granting aid (e.g., subsidies). Since special mention is made of subsidies in the Association Agreement, it is likely that pressure will be directed here. As regards British home trade prices for steel, there is no direct subsidy.[29] Indeed, the criticisms levelled in this respect by Continental metal-using industries have been singularly devoid of precision. They have in essence, simply argued that because British steel prices are lower than Community prices, they *must* be subsidized, without paying much regard to differences in cost efficiency. The only points at which

[28] It is interesting to note that the Community is now under similar attack, especially from Scandinavia. The G.A.T.T. discussions on the Community's 1954 Report have concentrated on this point.

[29] The subsidies on imported ore freights, imported scrap and pig iron, and imports of semi-finished steel for further processing, which were designed to meet abnormal post-war conditions, were withdrawn in 1949.

attack could be directed are the maintenance of a State-controlled price for scrap;[40] the industry's internal system of levies and remissions, which are designed to re-adjust the abnormal market relationship between home and imported ore prices and between pig iron and scrap prices;[41] and the N.C.B.'s pricing policy as regards coking coals.[42] On all of these points, however, a satisfactory answer is possible.

(iv) *Labour costs.* Continental arguments against alleged 'hidden subsidy' element in low British steel prices contained two respectable points. Firstly, it was held that our method of financing social security benefits very largely out of taxation keeps direct labour costs low as compared with those of Community steel producers who have to bear much larger direct social security charges. Secondly, it was held that British food and housing subsidies were intended to keep down living costs in order to restrain wage increases, and therefore represent an indirect State subsidy to producers.[43] The Agreement, however, specifically excludes wages and working conditions from any review of factors affecting the price structures, and neither these points, nor corresponding British pressure for increases in Community wage levels, can now be raised.

INVESTMENT AND DEVELOPMENT POLICY

Control over investment is the key to ultimate control over the future size and pattern of the British steel industry. To transfer control over investment and development policy to a joint U.K.-E.C.S.C. body would involve the sort of decisive transfer of sovereignty which the British Government has consistently refused. We are concerned in reality, therefore, only with forms of association which rest on consultation. In this respect, three issues arise.

(a) *Exchange of information.* A full exchange of information on development projects already operates through the Steel Committee

[40] See pp. 96-7.

[41] See R. Shone, 'Steel Price Policy', *Journal of Industrial Economics*, November 1952, pp. 47-50.

[42] The allegation of unduly-favourable treatment of the prices of certain grades of coal is easy to understand, but difficult to sustain. E.g., the export price of Durham coking coal was appreciably above the home price throughout 1953. But this was probably due, not to discrimination, but to the fact that two quite different pricing policies were being applied. At that time, home prices were being related to technical considerations concerning the quality and type of the various coals: export prices, however, were being related to purely commercial considerations. It may be noted that the change-over to commercial pricing principles for the home market in May 1954, led to particularly severe increases in the price of Durham, South Wales and Scottish coking coals.

[43] See Driscoll, op. cit., pp. 111-12.

of O.E.E.C. The provision for a similar exchange of information within the Council of Association which is contained in the Agreement commits Britain to nothing new.

(b) *Long-term demand forecasts.*[44] In practice, the British steel industry sets its long-term targets as the result of a dual process of discussion. The industry itself reaches certain conclusions as to both demand and production possibilities as a result of discussions within the British Iron and Steel Federation, and these are then discussed with the Government in the light of its views on the long-term development of the economy and — latterly — with the Iron and Steel Board. This process produced agreed targets for both the First and the Second Development Plans. The possibility of disagreement always remains, of course, and Section 5 (3) of the Iron and Steel Act, 1953, allows the Government itself to carry out development projects if the industry sets its sights lower than the Government and the Iron and Steel Board think wise.

On the Community side, the High Authority set up a commission of experts, under Professor Tinbergen, to estimate the long-term demand for coal and steel. The totals suggested by this Report have been used as the basis of the Community's development plans.

There would seem to be little difficulty in agreeing to the request in M. Monnet's 1953 letter for 'a continuing examination of the trend of the market . . . [to] establish in common the long-term outlook for consumption and exports'. Indeed, such a combined exercise might have considerable value. If Britain and the Community could agree on an estimate of long-term domestic and export demand, and could then each readjust its own development programme in the light of these estimates and the known plans of the other, much of the danger of surplus capacity — and the excessive competition to which it gives rise — would disappear. Britain certainly stands to lose much from an over-optimistic Community view of prospective demand, and any opportunity for an intimate reconciliation of views before these harden into official attitudes should be welcomed. It would, of course, have to be fully accepted on both sides that such consultation left open the possibility of disagreement and of divergent policies, if one side so saw fit.

(c) *Controls over Development.* Agreement on a common estimate of long-term demand and on the type and scale of development necessary to match it is useful only in-so-far as such agreement can be implemented. Unless the authority concerned can effectively guide, encourage and restrain the firms within its area, consultation at the centre becomes merely a paper exercise. It is of interest, therefore,

[44] See also, p. 106 below.

to compare the powers over investment possessed by the High Authority and the Iron and Steel Board.

TABLE VIII[48]

Development Controls

High Authority	Iron and Steel Board
1. *General Responsibility*	
To 'ensure that the common market is regularly supplied', (3a) and to 'promote the regular expansion and the modernization of production', (3g).	To secure 'the provision and use of such production facilities in Great Britain as may be required for the efficient, economic and adequate supply of iron and steel products', (5) (1a).
2. *Long-term Plans*	
H.A. to 'draw up programmes giving forecasts, for guidance, of production, consumption, exports and imports', (46 (2)). On this basis, H.A. to 'set out the general objectives with respect to modernization ... and expansion'. (46 (3)).	Board to submit to the Minister periodical reports on the industry's long-term development plans (16 (2)).
3. *Initiation of Projects*	
Sole responsibility of firms. No direct power of initiative granted to H.A.	Normally, the sole responsibility of firms. But if the industry refuses to carry out development which the Board and the Minister adjudge to be in the national interest, the Minister may carry out the project (5 (3)).
4. *Submission of Projects*	
H.A. may require firms to submit development projects for examination (54).	Board may require firms to submit major development schemes (6 (1, 2 and 6)).
5. *Rejection of Schemes*	
No powers of prohibition. But: (*a*) If project requires special State aid (e.g., subsidies or protective duties), H.A. may forbid the firm to finance it except out of its own resources (54). (*b*) If product does not need State aid, but is opposed on general development grounds, H.A. may publish an unfavourable opinion on it, which would greatly hamper access to the capital market (54).	Consent may be refused only if a scheme is 'seriously prejudicial to the efficient and economic development of production facilities in Britain (6 (3 and 4)).
6. *Active Support of Projects*	
H.A. may either grant a firm a loan, or guarantee a loan which the firm is raising (54).	No power to aid private schemes: but see under *Initiation of Projects*.

In general, the only difference lies in the respective powers to stimulate investment. The Board has the power to initiate investment (through the Minister) in certain cases where the industry refuses to act, while the High Authority can encourage projects by

[48] The references given in the Table are to Articles in the Community Treaty and to Sections in the Iron and Steel Act, 1953.

offering loans or loan guarantees: this clearly is a difference of technique rather than a matter of substance. The general responsibilities and the negative control powers of the two bodies are very similar. There are no grounds for supposing that the internal powers of investment control in the two markets would be inadequate to secure the execution of agreed development policies.

The general opposition in Britain to any abrogation of sovereignty over important economic decisions would seem to predispose policy strongly against any close joint supervision of investment and development policies. But, to the extent that Britain limits Community influence over British steel development, she would necessarily be limiting British influence over Community development: and such influence would be well worth having. The main potential danger to the British steel industry comes from the possible emergence of surplus capacity in the steel industries of the Community, and in particular in those countries which rely heavily on export sales. As in the inter-war period, such a development might lead to excessive cut-throat competition in third markets and possibly in Britain itself, below-cost dumping, the erosion of firms' capital resources, and the destruction of all hope of efficiency and stability. The choice of policy in this field is no simple one. Even considered on the basis of pure national self-interest, a very careful balancing of factors is required when deciding the degree of joint control over development which can be accepted.

MARKET TRENDS

The Agreement provides that the Council of Association shall exchange information and consult on, '(e) Market and price trends', and '(g) Trends of production, consumption, exports and imports'. These two matters obviously come to very much the same thing, and the probable intention of those drafting the Article can be guessed at only after reference to the Community Treaty and to M. Monnet's letter of December 1953. From these, it would seem that clause (e) is meant to refer to continuing studies of current trends and clause (g) to long-term forecasts.[46] If this interpretation is correct, then the latter point has already been covered by the discussion on 'Long-term demand forecasts' under 'Investment and Development Policy' above.[47]

[46] Article 46 of the Community Treaty distinguishes thus: the High Authority shall, '(1) carry on a *permanent* study of the development of the market and price trends', and '(2) *periodically* draw up programmes, giving forecasts, for guidance, of production, consumption, exports and imports'. Similarly, M. Monnet's letter of December 1953, suggests that the two parties 'should together undertake a *continuous* examination of the trend of the market and . . . establish in common the *long-term* outlook for consumption and exports'. (My italics.)

[47] See p. 104.

As to consideration of market and price trends, there is little to say within the scope of this paper, although this clause may in practice give rise to a large part of the ordinary work of the Council of Association. Clearly, the possibilities for co-operation are limited to the exchange of information and to exchanges of views. There is no scope for common action, and so no conflict is likely at this point.

One point which may arise here concerns the co-ordination of statistical services. Although much work has already been done to improve the international comparability of steel statistics, scope for further progress remains, and the Council of Association might usefully survey this field.

RESEARCH, ETC.

The Agreement provides for the joint consideration of three matters which may well be taken together here: 'technical developments and research'; 'the effects of the development of other sources of energy and substitute materials on requirements of coal and steel'; and 'arrangements for the promotion of the safety, health and welfare of persons employed in the coal and steel industries'. In each of these fields, there is much to be gained by the widest possible exchange of information, visits, personnel, and results.

CONCLUSION

In this paper, we have so far assumed that the High Authority would be in a position to exercise such control over U.K.-E.C.S.C. trade in steel as might be necessary for the implementation of any joint decisions. This, however, is by no means certain within the terms of the Community Treaty.

The Treaty requires the High Authority to open negotiations 'with the governments of third countries, and particularly the British Government, on general economic and commercial relations concerning coal and steel' (Section 14, Convention on Transitional Provisions). In the light of this Section, it might be held that the Community possessed such implied powers as would be necessary to secure this end.[48]

In fact, however, the Treaty nowhere grants such powers explicitly. It requires the High Authority to 'see that equitable limits are observed in prices charged in foreign markets' (Article 3f), and permits it to fix maximum and minimum export prices in certain circumstances (Article 61c). But the powers of the High Authority

[48] The doctrine of implied powers cannot be pressed very far in this case. The Community is created by the Treaty and can exercise only such powers and functions as the Treaty provides. Except on minor points, it would seem that if a certain power is not specifically granted, then it must be assumed that the signatories did not wish it to be exercised. The very detailed nature of the Treaty makes this all the more likely.

in the export field are, in general, in no way as clearly defined as are its powers in the common market. In particular, Chapter VI of the Treaty, which prohibits producers' cartels, specifically applies only to operations 'within the common market': it cannot, therefore, be held to prohibit agreements among exporters.

In practice, effective control of export operations has rested since March 1953, not with the High Authority, but with the European Steel Export Entente, made up of French, German, Belgian, Dutch and Luxembourgois producers. The High Authority, which had from the start been openly antagonistic to the Entente, sought to force it to dissolve in the autumn of 1953, threatening otherwise to close it down as contravening the provisions of the Treaty. This interpretation was promptly challenged, however, and the threat was not pressed home. In December 1953, the High Authority again sought to overthrow the Entente, this time by introducing maximum and minimum export prices of its own; but neither the Council of Ministers nor the Consultative Committee could be brought to support this course, and again the High Authority had to retreat. Since then, the High Authority has taken no further action against the Entente. Although its January 1954 Report declared roundly that 'the High Authority could not remain indifferent to the formation of a combine for the fixing of export prices for steel',[49] its two subsequent Reports have made no mention of the Entente, despite important changes in demand and prices on the export market.

At present, therefore, the influence which can be exercised by the High Authority over trade outside the Community is uncertain. *De jure* control is disputed; *de facto* control rests with the Entente. In these circumstances, it is necessary to view joint action with some caution.

A further point which requires close attention is the question of world trade in steel. In so far as U.K. and E.C.S.C. home markets remain protected and Britain retains her preferential advantages in Commonwealth markets, competitive pressures are likely to impinge most fiercely on the remaining areas, the so-called 'third markets'.[50] Since the demand for steel in these areas is probably price inelastic, and since in any case effective demand is often governed by the reluctance of the authorities to make foreign exchange available except in accordance with planned development priorities, price reductions in these third markets are unlikely to bring forward any large quantity of additional orders.

[49] *Report on the Situation of the Community*, High Authority, January 1st, 1954, p. 29.

[50] In 1953, E.C.S.C. countries exported 9.8 million tons (including inter-Community trade), and Britain exported 2 million tons. Together, they accounted for over three-quarters of the world trade in steel.

In these circumstances, one would have expected the Agreement to include some direct mention of the export trade. But the only references made are neither very prominent nor particularly clear.[51] Partly, as has been suggested, this may be due to doubts as to the powers of the High Authority in this field.[52] Partly, also, it may be due to a refusal by the High Authority to consider such agreements.[53] Whatever the causes, however, the absence of any clear provisions covering this matter leaves an important sector of U.K.-Community relations partly undefined. If competitive pressures in the world steel market intensified, and if the *de facto* authority of the European Export Entente remained unchallenged, the problem of how best to ensure price stability in third markets might become prominent, and it would be as well if the position of the Council of Association in relation to the export field were clarified.

Leaving aside these two questions — the external powers of the High Authority, and access to third markets — the Association Agreement appears to be a useful, but hardly an exciting, document. It involves very little real change in relations between the steel industries of the two parties, and does no more in effect than to create a loose institutional framework within which co-operation may—or may not — grow closer as time passes. The economic realities which correspond to the tag 'Association' are as uncertain after the Agreement as they were when the phrase was first used.

Since the essential purpose of the Community is a political one, the final comment on the Association Agreement must perforce be political also. Concluding an earlier review in this Journal of the Community's first year, I wrote, 'Though failure to implement the E.D.C. and E.P.C. projects may leave E.C.S.C. dangerously isolated, the common market has come to stay'.[54] The concluding phrase could equally be repeated today. As an *economic* experiment, the Community is working better than many favourable observers would have been prepared to forecast five years ago. But, equally, the preceding phrase bears repetition also. As a *political* experiment, the

[51] Two references apply. Article 6(2) (g) mentions 'trends of production, consumption, *exports* and imports', but probably refers to long-term trends: see p. 106 above. Article 9(b) requires the Council of Association, 'in fulfilling their functions' as laid out in Article 6, to have regard to 'the interests of third countries'.

[52] The rights of the Iron and Steel Board to connection with the export trade are nowhere specified in the 1953 Act. The Government's view appeared to be that the Board possessed such authority as flowed from its general supervisory duty under Section 3(1). See House of Commons Report: January 29th, 1953, Cols. 1276-77 and 1283-85; and March 17th, 1953, Col. 2091.

[53] The first Report of the High Authority (January 10th, 1953), declared that Association 'will not result in a trade treaty *or a division of overseas markets*—'. (My italics.) This phrase has frequently been repeated.

[54] Driscoll, op. cit., p. 117.

French failure to ratify E.D.C. and the virtual disappearance of the E.P.C. have left E.C.S.C. very dangerously isolated indeed.

The Community is now, in fact, something of an embarrassment to the friends of European Unity. Unless exceptional circumstances arise, the possibility of a federal solution to Europe's problems appears to have passed. The new course rests on the looser but wider structure of Western European Union, and depends for its cohesion on the presence of Britain as a balancing factor between France and Germany. But the initial success of E.C.S.C. means that in one key sector of European integration — the coal and steel industries — close British participation is inhibited by virtue of the Community's now-outdated supranational structure. The marked contrast between the close commitments which Britain has accepted in the military sphere under the Paris Agreements and the loose contacts developed in the coal-steel sphere under the Agreement on Association is a measure of that inhibition.

LONDON

SOME THOUGHTS ON THE PRICING OF TELEVISION RECEIVERS

by FRANK A. FRIDAY

1. THE dilemma in pricing an article is that although a price has to be fixed by reference to the cost of making it if a firm is to remain in business for long, this cost cannot be known without some idea of the number likely to be sold at that price. On the other hand this quantity can only be guessed. The price of consumer goods which matters is, of course, the retail price. Not only is this the price which determines the consumer's choice, but in many industries it is fixed by the manufacturer, the distributive trade being given agreed trade discounts. The purpose of this article is to discuss how these difficulties are met in arriving at the prices of television receivers.

2. Television is only one of many products made by the radio and telecommunications industry. This industry may, I think, be described as very competitive, since there are about 60 manufacturers of television receivers in the United Kingdom and these manufacturers offer approximately 200 new models to the public every year. This annual issue of new models is a characteristic of the industry, as it is of most durable consumer goods trades. The models are not, of course, new in every respect; the need to offer the public products containing new features arises primarily from the technical developments which are continuously occurring in the industry, although changes in fashion and taste have to be taken into account in the styling of the products. These technical changes vary in importance from year to year. Sometimes they are relatively insignificant although, in a new and rapidly developing industry like television, many small and apparently insignificant technical changes can, in the space of a few years, add up to an important improvement in the product. The change in the design of cathode ray tubes from round end to rectangular, for example, provided a rather better picture for viewers, although outwardly the sets on sale in retail shops were not noticeably different. On the other hand, when colour television is introduced there will be a spectacular and very obvious need for a completely new range of models.

3. One important result of these continuous technical changes is that they nearly always involve an increase in the ratio of the quality of the product being offered to its price. Thus real prices are in effect progressively falling, but it is well nigh impossible to measure statistically the effect on sales. This fall in real prices is

enhanced by improvements in the scope and quality of the television service, because the demand for television sets is derived from the demand for this service.

4. The consumer demand for television is subject to seasonal influences during the year, being in the autumn at a rate more than twice that in the middle months of the year. Retail prices do not in any way vary with these changes in seasonal demand. A price is often maintained throughout the life of a model. The only changes which occur within such a period with price-maintained goods like television sets are usually the result of substantial changes in the cost of materials and labour, or reductions which are necessary to clear large stocks of old products when new ones are about to be marketed. Thus once the retail price has been fixed it is changed infrequently.

5. Economic theory places emphasis on price changes to keep the demand for an article in step with its supply. I have said that price is relatively inflexible, but so also is supply in a period such as six months because television manufacturers will have for that period definite manufacturing programmes, which cannot be altered except at great inconvenience. As a result, changes in demand will show themselves in changes in stocks.

6. Variations in stocks at particular dates result broadly from three causes: (*a*) the new supply being out of step with the seasonal pattern of demand, although in total over the period the two might be equal, (*b*) orders being placed in advance of consumer demand, so giving a seasonal pattern to stocks; and (*c*) an error[1] in manufacturers' and distributors' estimates of the new stock of television receivers required by consumers in that period. So far as (*c*) is concerned, large stocks of old models will be cleared by price adjustments, but it is doubtful whether there is any virtue in allowing prices to fluctuate throughout the period in order to keep stocks at all dates down to some sort of minimum level. The existence of price maintenance makes such flexibility impossible, but this is not the reason for stability in manufacturers' prices.[2] Manufacturers do not necessarily try to keep the supply of television receivers matched to consumer demand at all times because an even — or less uneven — rate of production is a preferable policy from many points of view. Manufacturers who try to plan an even rate of output

[1] A manufacturer's first customers are wholesalers or retailers. Even with good overall forecasts on the manufacturer's part there could be serious local errors.

[2] The case against retail price maintenance, as I understand it, is not that prices should necessarily be made flexible through time but that the price of any one model should be allowed to vary between traders to take account of any greater efficiency on the part of one trader compared with another. Abolition of retail price maintenance would, however, make some degree of flexibility through time also possible by distributors.

are faced with the need to carry high stocks at certain times or arrange for the trade to help carry them. Flexible prices would therefore reflect more than a disequilibrium between forecast demand and actual demand. But whether prices are flexible or not, the problem to the manufacturer is the same in the end. He has two important decisions to make: (i) the number of sets which will be available because this is his factory programme for the next period (say six months); and (ii) the price, for only with this can an estimate of revenue be compared with expected total expenses. For convenience television manufacturers (and this is true of suppliers of many other consumer goods) prefer to have stable prices for the sale of the new supply.

7. When fixing prices, manufacturers have no certain evidence about the nature and prices of competitors' new models nor any information about the likely demand for these new products. This difficulty grows as technical modifications increase in number and importance. Thus a manufacturer, in fixing the price of a new product, can only roughly assess the likely demand from the sales (his own and the industry's, if he knows the figures) of similar products in the past.[1] This would be a formidable difficulty if manufacturers sold a product of only one quality, but in fact for many articles like television they offer a wide range of different models.

8. The existence of a range of models would alone blur a demand curve if such a curve could be constructed even for the industry as a whole. Let us look at this more closely. A range breaks down a market into a number of different but by no means separate markets. The differences between products in a range are essentially quality differences which are, of course, reflected in price differences. These differences may be large. The 'His Master's Voice' range of television receivers, for example, at the time of writing, consists of 16 models, the cheapest being a 14-in. table model priced at £63, the dearest being a 21-in. console model priced at £265 (both prices inclusive of purchase tax). For all manufacturers, demand curves may be imagined as existing for each part of a range. On the other hand, these separate demand curves can exist only on the assumption that the margins between the prices of each model in the range remain stable. As soon as these margins are narrowed, for example by the introduction of additional models, the whole set of demand curves is changed.

[1] There are peculiar difficulties with the demand for durable goods, arising from the period of growth of ownership, the long intervals between purchases and the existence of a secondhand market. For a fuller discussion of these, see my 'The Problem of Business Forecasting', *Journal of Industrial Economics*, Volume I, pages 67 and 68.

9. A firm's share of the market for television receivers is determined by the extent to which it caters for all parts of the market as well as by its ability to offer goods at competitive prices. Thus, for the market as a whole and for individual firms (four only are taken for simplicity) the pattern may be imagined to be as follows:

Total market:	p_5	> p_4	> p_3	> p_2	> p_1		
	x_5	x_4	x_3	x_2	x_1	=	$\sum_1^5 x$
Firm A:	p'_5		p'_3	p'_2			
	x'_5		x'_3	x'_2			$\Sigma x'$
Firm B:	p''_5	p''_4		p''_2	p''_1		
	x''_5	x''_4		x''_2	x''_1		$\Sigma x''$
Firm C:			p'''_3	p'''_2	p'''_1		
			x'''_3	x'''_2	x'''_1		$\Sigma x'''$
Firm D:		p''''_4		p''''_2	p''''_1		
		x''''_4		x''''_2	x''''_1		$\Sigma x''''$

10. As the price differences reflect quality differences — differences of size, technical ideas, quality of materials and workmanship, etc. — a range of models is essentially a classification of the products by their 'features'. Competition between manufacturers consists in offering products having similar 'features' at prices which are similar. If one firm fixes a price which is noticeably out of line with the prices of models of similar size and 'features' then it will begin to lose its share of that part of the market and, unless it revises its price, it may lose it completely. Consumers who want a television receiver containing a 21-in. tube in a large floor cabinet with a radiogram and room for record storage will be willing to pay a high price; even so, they are usually influenced by the prices at which different manufacturers offer such a product. Firms A and B, for example, who are offering products in the top range should, quality for quality, be offering them at very similar prices. If there is any large difference between the two prices, the firm overpricing its product

must expect fairly quickly to lose sales to its competitors. If, in fact, its prices are *generally* higher over the whole range of products, the firm will lose ground in the total market.

11. In terms of the simple pattern in paragraph 9, firms A and B might be expected to have equal shares of the market for the product in the dearest part of the range ($x'_5 = x''_5$ when $p'_5 = p''_5$); firm B would have all of the demand for the next dearest model (p''_4) to itself; firms A and C would have equal shares ($x'_3 = x'''_3$) of the products sold at identical prices p'_3 and p'''_3; similarly all four firms would have equal shares of the demand for the next part of the range (i.e. $x'_2 = x''_2 = x'''_2 = x''''_2$); and the firms B, C and D would have equal shares of the sales of the cheapest model in the range. This simple situation is not, of course, found in reality. Products are rarely in fact identical in their 'features' and are not of exactly equal price. Firms have their own ideas about cabinet and circuit design, and, even at identical prices, the designs of some manufacturers attract a larger proportion of consumers than the designs of others. The comparison between one maker's sets and another's is therefore never as simple as the preceding paragraphs imply; it is not a matter of indifference whether the products of firms A, B, C or D are bought. But experience soon shows that it is foolish for a manufacturer to assume that consumers are wholly irrational and buy without reference to whether any differences in prices adequately measure the value of the differences in features. A trade mark gets a good reputation only because it has in the past represented good products, but there are usually many other good names available in the same trade. Even the best of branded products will soon lose its reputation if it does not continue to represent good value for money in comparison with all the other products bearing good names. Although a television set is bought only once in a number of years by any one consumer, the manufacturer's immediate customers, the wholesalers and retailers, are well aware of a deterioration in quality and performance in the products of a firm, or of unaccountable differences between the prices of different manufacturers' products. And with a number of reputable firms' products on offer, retailers will advise customers and order from manufacturers accordingly.

12. What, then, has to be assessed is how far one's own new models are going to be more appealing to the public at the prices finally determined than the unknown products which are going to be offered at unknown prices by competitors. This is especially difficult to decide at the lower end of the range where the differences between products in one part of the range and another will not be large—

e.g., merely a difference between 14-in. and 17-in. tube size with perhaps a slightly larger cabinet for the latter. A manufacturer whose prices are somewhat below those of his competitors will hit the sales of products not merely in a similar part but also in nearby parts of the ranges of competitors. The finer the price differences between products in a range the greater the need for firms to be competitive in their price fixing and the more difficult for them to assess the quantities demanded.

13. Although there may be theoretical solutions to this problem, in practice the task of constructing a demand curve for each of a firm's products is virtually an impossibility.[4] All that a sales manager can do is attempt to fix prices in the light of his past experience of the kinds of competitors' models available, the prices in the past of those products, changes in design which are being offered by the designs people in his own firm, and the estimated costs of making new products embodying these changes. The final decisions on the new products to be offered to the public are the results of a close collaboration between the sales and designs staffs. The sales people are dependent on the designs people to offer changes which are worthwhile improvements in the product and which are at least as good as anything likely to be offered by competitors. But the sales staff have to assess these changes in the light of their probable cost and therefore effect on the retail price. Models embodying alternative sets of 'features' in alternative styles of cabinet are carefully considered and estimates are made of the cost of producing the alternative models under consideration.

14. How are these costs arrived at? The estimation of costs *before* a product goes into production is common in the large-scale manufacture of durable goods for sale from stock, especially where those goods are mass-produced. Actual costs can never be known until after a product has been made, and even then the costs are really estimates involving an arbitrary allocation of indirect costs. For many firms there are usually at least two stages in the assessment

[4] In my discussion of prices there are some implications about the demand curve for the products of an individual manufacturer. Before such a demand curve can be drawn all other prices must be taken as fixed. It would be impossible to get the data to construct such a demand curve but it would also be wholly unrealistic because the prices of competitors' products always respond to any downward movements in the one firm's prices. A practical view of the demand curve must be that of a competitive price limit above which the firm's sales will deteriorate, but at which it can maintain its position in its industry. A sales manager, when fixing the price for a new receiver, must think dynamically, for example in terms of the expected growth in the television market. He cannot think in terms of some simple relationship between quantities which are varying solely with changes in prices. The concept of a competitive price limit has led him to find a practicable way of relating the prices which rule in the market to his firm's normal costs. He is thus able to move easily from his costs, which he can estimate fairly reliably, to a forecast of the price at which he will be able to meet the competition of others.

of costs *before* work is begun: (*a*) Estimating the cost of a set before the final specification is agreed, and (*b*) estimating what the average cost will be when the model goes into production.

15. The cost of making a single product may be determined beforehand for a given period, usually the financial year, by using the standard costs of the various operations and of the materials. A 'standard cost' provides a stable basis for accounting entries during that year and is also a standard of reference against which actual costs as they become known can be compared. Thus materials are taken into stock at a standard predetermined cost which is the basis of accounting entries when these goods are moved from, for example, the stores to the machine factory. Similarly, the cost of direct labour is taken at standard rates and applied to standard times per operation, thus giving a standard direct labour cost for each component made in the factories. The overheads of each factory are also taken as standard percentages (for example, as percentages of direct labour costs) so that, as goods move from one factory to another, the supplying factory is credited with an amount covering standard prime costs plus standard factory overheads. The cost of the final consumer product consists of the sum of all these standard factory credits for materials and components, in accordance with the detailed specification of the product in question.

16. The standard overhead is based on a normal output load which represents the annual rate of output which can reasonably be expected from the factory when it is running at full, or near full,[1] capacity. After making due allowance for normal breakdowns of machinery and the normal relaxation requirements of labour (such as tea breaks and unavoidable waiting time) separate standard factory overheads can be computed for each factory. Indirect expenses are usually allocated as closely as possible to those parts of the firm's activities where they arise. In some cost systems, departmental indirect costs can be allocated to the prime costs (or to one element, such as direct labour) of the processes in that department. The other more general factory overheads are then allocated to the total output of all the departments in the factory. And the more general administrative expenses of the firm must be spread over the

[1] This is often referred to as the 'normal' output but it cannot, in practice, be defined precisely. For a television manufacturer having seasonal sales, the maximum output (at normal hours) varies according to the extent to which all the fluctuations in demand are transferred to the manufacturing programme. Then, plant replacement and repairs, and extensions are always occurring so that the theoretical maximum at normal hours is being altered all the time. A factory manager will understandably draw a distinction between this theoretical maximum and a practicable maximum which makes some allowance for troubles. But the maximum factory capacity with overtime working will be much greater still.

whole of the firm's turnover. But whatever the method of allocating indirect expenses, the level of output taken is related not to any quantities from a demand schedule but to a normal capacity rate.

17. When discussions are taking place between the sales and designs staffs regarding the choice of new models, these standard factory credits will not and cannot be known. When alternative models are being examined, it is necessary to make preliminary estimates of the likely factory cost; these preliminary estimates are forecasts, as it were, of the forecasts (factory credits) of estimated actual cost. They are preliminary standards.

18. A new design for a model, apart from changes in material and labour costs, will mean a different factory cost from that of the previous model in the range. The estimating department, in making their preliminary estimate can, if the model is not too different, take into account the past costs of similar models and then make allowance for the changes being considered. Alternative models for any part of the range embodying different styling and technical features are the subject of many discussions, and for every model a preliminary estimate is made by the estimating department. With the exception of any special tool cost, which is normally spread over the number of models to be made from the tool, these preliminary estimates are unaffected by the quantities likely to be demanded. These preliminary estimates not only provide the basis for fixing selling prices, but also help to determine the final specifications of the model. As pointed out in paragraph 13, the sales staff must view the changes in model being submitted by the designs staff in the light of their effect on the retail price (the process of getting from standard factory costs to retail prices is described in the following paragraph). If this retail price seems to be too high in the sales manager's judgment, he will press the designs staff to make modifications which will bring the preliminary standard cost down to a figure which will produce the sort of retail price which he has in mind. Whilst, from the designer's point of view, this must involve some departure from the ideas which he had, it must also, from the sales manager's point of view, not involve a sacrifice of reliability and efficiency if, in his attempt to force prices down, he is not to injure his sales and damage the firm's goodwill.

19. The price charged to the distributive trade represents the retail price (excluding purchase tax) minus fixed discounts — for television these discounts are 30 per cent to retailers and 40.5 per cent to wholesalers. A simple way of covering these discounts and of covering the firm's general overheads in respect of administration, research, development, selling and distribution and free service is

by applying to the preliminary estimate of factory costs a multiplier which is known from past experience to cover all these items and, with normal capacity output, show a reasonable profit on the capital employed. A standard is thus used, *explicitly*, in the computation of factory overheads and *implicitly*, in the multiplier which takes into account the general overheads of the manufacturing firm and the trade discounts, thus:

Preliminary estimate of factory cost per model:	
a Direct materials $+ b$ Direct labour $+ c$ Overhead $+ d$ Special tool cost	For each factory
$= e$ Total estimated factory credit	Multiplier $= \frac{e+f+g}{e}$
$+ f$ General overheads: research, development, central administration, selling, service, profit $+ g$ Trade discounts	$= \frac{h}{e}$
$= h$ Retail price, excluding purchase tax	

It does not follow that the resultant retail price, rounded off to the nearest pound or guinea (nowadays this is often done to the price inclusive of purchase tax) will always be adopted. The retail price finally adopted must be in line with competitors' prices for similar goods.

20. Prices are fixed by reference to a normal cost because this is the only sure basis a sales manager has of forecasting market prices. The multiplier expresses the past relationship between market prices and the manufacturer's normal cost, so the price arrived at by its application to preliminary standards should be about right. Competitors' prices for similar models should be similar. (For radio sets it has even been known that, at the annual show, a manufacturer, having seen the prices of competitors' products, has gone back to his own stand and changed his price tickets downwards.) Although reducing price enables the firm to sell in competition, matters cannot rest there. A manufacturer's normal costs have this relationship with market prices because the present size of the firm is largely a reflection of the sales achieved in the past.

If its standard costs have been properly computed, yet the multiplier produces too high a price, the firm's costs must now be out of line with those of its section of the industry.

21. What are the reasons for this?[6] There are three. (1) *Technical.* These can be subdivided into two classes: Those which concern the design of the product and those which concern the process of manufacture. For example, on the first, some of the leading competitors of the business concerned may have been able so to re-design their products that they make considerable savings in the material and labour elements of costs. Independently of this, some competitors may have adopted improved processes which similarly have reduced their costs of a product. Conversely, the firm whose standard costs are too high may be suffering from the fact that it has not maintained properly or replaced worn-out or obsolete plant. (2) *Administrative.* There may have been a general deterioration in the administration of the company showing itself in a rising incidence of overhead costs as compared with competitors. (3) *Commercial.* The firm may have bought materials and components at rather higher prices or been forced to pay higher average labour rates because of difficulties in its own area.

22. There is thus an efficiency significance to management when they are forced to depart from the retail prices computed on the basis of standard costs. Let us now examine the significance of differences between actual costs and these standard costs. Speaking broadly, actual costs may differ from standard costs for three reasons:

(i) The actual volume of output in the financial year may differ from that forming the basis of the normal, or standard, costs. The aggregate of sales budgets (detailed forecasts which when accepted become the factory programme) gives the first indication of this. If, however, they do not provide a full factory load, selling prices cannot be raised to take account of the higher actual costs which will result from the smaller spread of overheads. There is usually some flexibility given to a sales programme from having a range of television models and other products. It follows from this that maximum output capacity and total sales are always changing and one of the problems of management is to keep them closely in line.

(ii) The prices taken for materials, labour and other services in the standard cost may be different from those actually incurred

[6] I am not discussing the case of simple price cutting where one or more firms are deliberately pricing below the figures which they would ordinarily have quoted on the basis of their normal costs. These are usually short-term measures for special reasons and affect a few products only. This is, however, as was shown in paragraphs 4 and 6, a normal method of clearing stocks at the end of a period when there have been errors in the estimates of the numbers required and the models in question are not being continued.

during the financial year. This is a forecasting problem. Inability to foresee rises will eat expected profits away unless selling prices can be revised. A revision is likely when there is a substantial rise applicable to all firms in the industry, but there is always a danger that some time may elapse before the full effect of this is discovered, by which time a large part of the factory programme may have been invoiced.

(iii) Apart from price movements, actual expenses may differ from those taken in the standard costs. This is essentially an efficiency problem. Certain indirect expenses may be showing unexpected changes and the usage of materials and time be different from what had been estimated as reasonable.

23. Next year's normal costs are influenced by this year's actual costs. This means that the second and third sets of variances in the preceding paragraph will, through the multiplier, be taken into the selling prices being fixed. The third set of variances in particular will account for a disturbance of the past relationship between market price and normal cost. Competition does establish a retail price which, even allowing *some* room for slight differences not accounted for by differences in features, can only be exceeded at the cost of a declining share of the market. A standard cost which has produced, by use of a well established multiplier, a selling price too high will be suspect. The dilemma in pricing is thus solved by a method which provides also a measure of efficiency.

HAYES, MIDDLESEX

COAL: THE CASE FOR A FREE MARKET[1]

by GEORGE POLANYI

PROFESSOR BEACHAM, in his article on 'Fuel and Power Policy'[2] suggested that the recent estimates of future fuel needs in this country have tended to exaggerate the upward trend of demand and that it may not after all be necessary to plan for a major expansion of coal output or to worry if it is not forthcoming. I would like to carry the argument one stage further and suggest that the time has come to abolish government restriction on the price of solid fuel and to restore the market price mechanism in coal supply.

In saying this one is not putting forward anything original. The efficiency of the price mechanism working under free competitive conditions is an axiomatic doctrine among economists. And yet, between the two extremes of those who think this is too obvious to be worth stating and those who regard it as too outrageous to be mentioned, the argument for a free market has not received the attention it deserves.

THE ECONOMIC CONTEXT

It is not, of course, suggested that there has never been a fuel shortage, in the sense of a disequilibrium which the market mechanism could not hope to cure. During the war the supply of labour to the coal mines was directly controlled as part of the manpower programme, and the free market price for coal — if it had been allowed to emerge — would have been useless as an economic indicator. To create conditions of freedom in labour and material supply in which the proper function of coal price could have been restored, would have been to invite runaway inflation and a collapse of the currency. To a lesser extent the same argument would apply in the period of intense post-war inflation up to 1951, when labour controls were still either in operation or held in reserve as a weapon of last resort, while the supply of basic materials remained largely government-controlled.

At present the position is entirely different. We have behind us the experience of 18 months of price stability up to the middle of 1954 and of a static or downward trend in American prices which has now continued for over two years. The main force of the post-war tide of inflation has been broken. Most of the physical controls

[1] The views expressed in this article are the author's personal opinions and not necessarily those of any organization with which he is associated.

[2] *Journal of Industrial Economics*, December 1954.

have been removed, both in the U.S.A. and in Britain, and in the foreign payments field full convertibility has moved on to the map as a practical objective. Control of coal prices and allocation of coal supplies is almost the only major relic of the restrictions imposed in the period of intense inflation.

COAL CONTROL SYSTEM

Before examining the arguments for and against extending freedom to coal prices, it is worth recalling the main facts of the present control system. Direct government control over delivered prices is exercised only in the case of domestic coal, where local Fuel Overseers are charged with ensuring that the statutory maximum price for each of the seven grades of domestic coal is not exceeded. The maximum amount to be supplied per household in each summer and winter period is also fixed under the same statutory order which fixes the price.

Coal prices to industrial consumers, to the merchants, and to the fuel-converting industries are not subject to statutory regulation but government control is exercised by what Sir Hubert Houldsworth recently described as a 'gentleman's agreement', whereby prices are, for the most part, kept below the free market level. The excess of demand over supply is dealt with by 'programming'. This procedure differs from rationing in that the amount allowed for each six-month period is not a guaranteed quantity, but is treated as a provisional allocation, subject to changes in the light of changing national priorities and in accordance with the rise and fall of stocks of the various types of coal.

In the main, all these allocations are based on past consumption and stock levels in the case of larger users, and on an average of 'reasonable' consumption in the case of domestic consumers. Under normal conditions the allocations set out in the programme will be supplied in grades of coal reasonably appropriate to the particular user, but in the last resort the undertaking to supply covers quantity only and the programme will be regarded as fulfilled if a substitute grade is provided.

SHORTCOMINGS OF COAL CONTROL

The main argument against this system, from the point of view of optimum use of available coal resources, is that it fatally weakens the incentive to fuel saving. As the Ridley Committee put it: '. . . the present system of industrial coal allocation, intended to meet each industrialist's demands in full, removes any incentive for the individual firm to increase fuel efficiency as a means to avoid fuel

shortage. It may even lead to the postponement of efficiency measures, since firms may be reluctant to cut their fuel use until allocations are cut – fuel inefficiency may provide a cushion in a fuel crisis'.[3]

The Ridley Committee, being divided on the issue of prices, naturally stressed the physical, as opposed to the financial aspect of the deficiencies of the present system, and these are certainly sufficiently striking. Any endeavour to induce industrialists to improve their plant, or to spend money on high-grade staff for the boiler house in order to raise their standard of fuel efficiency in plant operation, is bound to be undermined by a system which favours those who have run down their coal stocks, at the expense of others who have conserved their stocks by a more careful use of fuel. But apart from this, there is also the decisive objection which arises from the fixing of coal price below the level where supply is equated with demand. This inevitably means that the full cost of coal consumption, as measured by the return which the resources used in producing the marginal tonnage could earn in other employment, is not reflected in the firm's accounts.

To some extent the difference between coal cost to the firm and coal cost to the nation may be offset by public-spirited motives, but even where this is the case there remains the difficulty due to the absence of continuity in the supply of particular grades of coal under the present system of allocation. A project for fuel economy through the improvement of plant or methods of operation is bound to be evaluated on the basis of the expected level of increased fuel efficiency from which additional costs entailed in the project will be recouped. But efficiency is, in practice, largely dependent on the grade of coal used in the plant and if the coal actually supplied yields a loss of 20 per cent in fuel efficiency there is nothing to be gained from a project which promises a 10 per cent fuel saving.

Alternatively, if the correct grade of coal is supplied, but in insufficient quantity, then the loss in sales revenue, due to the reduction in output, is likely to be far more substantial than any feasible fuel saving. Even a variation in delivery periods, which may easily occur under a system where stock levels at the pithead and at all successive stages are largely insensitive to changes in demand, can entail major outlays in rehandling which may well offset an anticipated fuel saving. In fact, the whole machinery of coal allocation and coal delivery is at present so rough and ready in its impact on the consumer that investments in fuel saving, to be

[3] *Report of the Committee on National Policy for the use of Fuel and Power Resources.* Cmd. 8647, September 1952, p. 41.

recouped over several years of fuel consumption in which the conditions of fuel supply cannot possibly be foreseen, are hardly likely to appear attractive.

But the trouble goes deeper than that. Even if fuel efficiency, measured by the usual standard of output per unit of energy consumed, were to be adequately maintained, there would still remain the much more important question of national economic efficiency per unit of fuel consumed. Last year's coal consumption and this year's coal stocks at a particular factory may be an adequate guide to keeping that factory going, but it tells you nothing about the profitability or otherwise of continued production at this plant, or about the desirability of switching the coal supply to some other concern which may be able to make a bigger contribution to the national wealth. Equally, when a cut in coal supplies becomes necessary, the 'national priorities' which are used to determine who shall be cut and by how much, are necessarily based on past performance. And yet, if there is one thing certain in business life, it is that the firm which made the biggest contribution to last year's exports will not necessarily be the one to do so this year.

And this, of course, is only the first approximation of difficulty. It is quite possible that if coal had been allocated differently in the period on which the programme is based, the outcome of exports would have been different. Moreover, there is no guarantee that the value of exports will prove a reliable guide to the contribution which a firm has made — or could make — to the national well-being. Once one begins to consider the economic implications of planned coal allocation in all their ramifications, one is brought up against the whole range of impossibilities which beset the planner who tries to approach administratively the optimum result which would be the outcome of the interplay of market forces.

ARGUMENTS AGAINST PRICE FREEDOM

From the point of view of the economist, the most weighty argument against the abolition of government control over coal prices is the suggestion that the demand for coal is so inelastic that, within very wide limits, it would be impossible to induce consumers to make major economies by raising the price. This argument was put forward to the Ridley Committee and was accepted by that section of the Committee which decided against marginal cost pricing. It seems to be based mainly on the general consideration that fuel costs make up only about 4 per cent of personal expenditure and only 3 per cent of industrial costs, although in a few industries the proportion rises to 10 per cent or more. Specific evidence from

studies of fuel demand is extremely scanty, but the paper by K. S. Lomax on 'The Demand for Coal in Great Britain'[4] sets out a correlation analysis which shows that changes in coal prices, relative to the level of consumer goods prices as a whole, appear to have little to do with the trend of coal consumption.

The trouble with this argument is that it entirely neglects the question of elasticity of substitution between coal and other fuels, and between the different grades of coal. There is ample evidence from the experience of those engaged in selling the various alternative fuels that relatively small price changes do have a major influence on the choice of fuels. Many factories are in fact equipped to change over at short notice from coal to oil, gas, or coke; from outside gas supply to their own gas production plant; or from public electricity supply to electricity generated within the factory. Changes of this kind have taken place on a considerable scale in the post-war period as the relative costs and scarcities of the various fuels have altered, and in many cases changes undertaken immediately after the war, when everything favoured the choice of oil, have since been reversed as conditions have changed.

The domestic user is, for the most part, equally well equipped to take advantage of changing prices. About 80 per cent of houses in the country are connected either to gas or electricity supply, and probably about two thirds have gas as well as electricity available in addition to their coal supply. It is true that sample investigations have shown that most people are unaware of the price of gas per therm, and probably the same applies to the cost of electricity per unit. But this in no way indicates that demand is unresponsive to changes in relative costs, as people are perfectly capable of comparing the total annual cost of one particular combination of different appliances in satisfying their needs for heat and power, with the cost of another possible combination which either they or their neighbours have tried in a previous period. There is no need for precise statistical enquiries in this field to confirm what every salesman in gas, electricity, coal or oil will know from bitter experience; namely that demand is highly sensitive to changes in relative costs of these fuels.

One may conclude, therefore, that the changes in relative fuel costs which are certain to result from the abolition of control over coal prices will have a major effect on the general pattern of fuel consumption, and that this will be so in spite of the lack of response of consumer demand to changes in coal prices relative to the level of prices as a whole, which Mr. Lomax has demonstrated. And shifts

[4] *Oxford Economic Papers*, February 1951.

in the proportions of different fuels within the total energy supply — with the consequent changes in utilization efficiency which this implies — are bound, in their turn, to have a major effect on the total amount of coal required. Thus, the objection based on the inelastic character of coal demand cannot be accepted as valid.

The opposite argument, which was also advanced by the opponents of marginal cost pricing on the Ridley Committee — presumably on the analogy of the Law Courts, where one can put forward an alternative, though contradictory plea — is that the cost of fuel does in fact enter largely into the total costs of manufacture and also into the total of household expenditure, and that an increase in the price of coal, such as might be expected if the controls were removed, would raise the price of Britain's exports and thereby price them out of the world's markets, and would also inflict a major hardship on household users. The validity of this approach depends, of course, largely on the actual amount of the increase which one would expect if the price were free to reflect market demand. This would vary in the case of each particular grade of coal, but such evidence as is available suggests that it would probably not be more than about twenty to thirty shillings per ton of coal. Assuming, as seems likely, that the increase would fall mainly on the higher grade coals, one can estimate the consequent rise in average coal cost to industry at probably not more than 30 per cent, or around 1 per cent of total industrial costs. The additional bill on domestic coal would probably not exceed about seventy shillings per annum, on average, for each household in the country.

One can hardly imagine that increases of this order would have a major influence either on the demand for British exports or on the total effective heat and energy purchased by the average domestic user. Apart from individual cases of hardship — which should be dealt with through the established machinery of welfare payments and not through the manipulation of fuel prices — the adverse effects of the initial rise in prices due to the abolition of coal controls are not likely to be of major consequence. It would seem, therefore, that the objection to coal price freedom based on high elasticity of coal demand has just as little validity as the alternative objection based on low elasticity.

Arguments about elasticity may seem to have the most cogency from the point of view of economic accounting, but they are not in fact the substance of the most vociferous resistance against freedom for coal prices. The kind of opposition which was aroused, for example, when the Director General of Marketing at the N.C.B., Sir William McGilvray, recently declared that he thought the time

had come to scrap the system of government allocation and return to ordinary commercial coal selling, is based on much less precise and, at the same time, much more powerful motives.

On the one hand, there was the response of the fuel experts, as voiced in the technical press. For this section of opinion a national fuel policy – properly conceived – would be one which would allocate coal in accordance with the recommendations of a committee of fuel technologists and would then compel the consumer to fit in with the dictates of maximum fuel efficiency as determined by the experts. The idea of a master plan of this kind has been greatly weakened by the unequivocal assertion of the opposite principle of allocation by free consumers' choice which is set out in the report of the Ridley Committee. Nevertheless the advocates of planned fuel policy, conceived in this sense, are still hopeful and they naturally reject with the utmost vigour any suggestion that the power of the government to intervene in the allocation of coal supplies should be abandoned in favour of free commercial selling by the Coal Board.

The other main section of powerful resistance against the idea of freedom in coal supply is centred, paradoxically enough, in the field of private enterprise, where the coal merchants are violently embattled against the proposal for commercial freedom which came from the spokesman of nationalized coal. The Coal Merchants Federation publicly rejected Sir William McGilvray's proposal and denied his statement that the suppressed demand for domestic coal which would be released by the abolition of rationing would probably amount to only about 1 million tons per annum. They preferred to adhere to the original Ridley Committee estimate of a 5 million ton demand deficiency, which was actually based on the trend of fuel demand in the highly inflationary period up to 1951. They considered that extreme hardship to consumers and a breakdown of coal supplies would result from the removal of the present restrictions.

The merchants inevitably bear the brunt of consumers' complaints in periods of shortage and they are afraid of being left helpless in face of a flood of demands which they cannot hope to satisfy. Their lack of faith in the efficacy of a free market as a means of reallocating supplies and thereby overcoming shortage may seem surprising, but memories are short and theoretical considerations carry little conviction as against the painful experience of recent years when the domestic coal 'rationing' system has seemed to be the only protection against a breakdown of supplies.

In fact, however, it seems doubtful whether there is at present any 'suppressed' demand for domestic coal, amounting even to

1 million tons per annnum. The inflationary pressure in the economy has so far abated that electricity and gas supplies are now, in general, adequate to meet winter peak demands. Consequently, the pressure on domestic coal supplies has not been nearly so intense in the winter of 1954-55 as in earlier 'crisis' winters. The recent coal shortage had every sign of being caused by a seasonal breakdown of deliveries and of movement of supplies between distribution centres, such as can be expected if stock building is centrally planned on the basis of a normal winter and mistakes cannot be remedied, even at the usual level of efficiency of a planned system, because stocks in domestic premises are not known. Probably it would be safe to guess that the total amount of coal now available over the year as a whole in the domestic sector would be fully adequate to meet the demands arising from existing consumption patterns, once the rigidities inherent in the system of controlled distribution had been eliminated by the restoration of a free market.

COAL PRODUCTION

The case against freedom in coal prices has so far been reviewed as it affects the demand side of the coal equation. But freely moving prices will obviously exert a powerful influence on coal production. At this point it may be useful to explain what kind of price is envisaged under free market conditions. The Ridley Report examined in some detail the relative merits of marginal versus average cost prices. Those members of the Committee who favoured marginal cost seemed to envisage a system where the cost reflected in prices would be that of the marginal supply under the existing conditions of restricted demand and not the higher marginal cost that would probably emerge — at least over a short period — if government controls were abolished. The purpose of their proposal was to provide an acceptable half-way house between the extreme disparity of controlled and market prices, which existed at the time of writing the report, and complete market freedom, which would at that time have released a very considerable pressure of suppressed demand. It was hoped to avoid the short-run rise in costs and prices by continuing controls until costs in coal mining had been reduced by the completion of schemes of capital investment, and consumption had been checked by the proposed limited rise in prices. It was also suggested that the price increase should take the form of an excise duty, of which the proceeds would go to the Exchequer and not to the N.C.B.

What I am suggesting is full commercial price freedom; which means allowing prices to rise or fall to the full extent dictated by

market forces and allowing the National Coal Board to retain any profit which may accrue to them from the sale of coal under free market conditions. How far this would result in precise equality between prices and marginal costs in coal supply is of course an open question. Some degree of internal averaging of costs will undoubtedly remain and the tendency in this direction is bound to be strengthened by the recently established system of regional delivered prices, with transport costs averaged, which substantially weakens the incentive to competition between coal fields — not to speak of individual Areas or pits — within the industry. Nevertheless, the pressure of competition from oil and atomic electricity and from the converted coal-based fuels is bound to increase substantially in a free fuel market and if this is reinforced by freedom to import fuel, which is the natural corollary of freedom in the home market, there will be few sectors of coal supply exempt from the inducements and penalties of competitive enterprise.

With profit margins under pressure from the competition of other fuels, and with the profit criterion strengthened — as it is bound to be when success in the market and not government planning determines the allocation of resources between fuel industries — one can expect each section of the National Coal Board enterprise to do its utmost to derive the maximum return from the resources under its control. And, in practice, that implies a persistent pressure towards marginal costing, since a price less than marginal cost will yield less than the maximum possible profit and a price higher than marginal cost brings the risk of loss of business to competitive fuels. Clearly, the inducement in both directions will not be as strong as it would be if individual pits competed freely with each other, but it will be strong enough to bring the relative costs of the various grades of coal roughly into line with the relative scarcities of the resources needed to replace them by alternative fuels. And this in itself would represent such a decisive advance over the existing system of rigid prices and planned allocations that hesitations based on theoretical perfectionism may be safely put aside as of secondary importance.

PROFIT AND LOSS

In view of the very considerable difference in cost levels between the most efficient pits and those where mining is most difficult the approach towards marginal cost pricing under conditions of stable or expanding demand would tend to result in a substantial profit for the National Coal Board. This fact, in itself, has seemed to some observers to be a valid objection against a de-control of coal prices.

Professor Beacham has put forward this objection in an earlier article in this Journal[5] where he pointed out that the usual interpretation of the nationalized fuel industries' statutory obligation to balance their accounts, 'taking one year with another' was that they should make neither profits nor losses. This was undoubtedly the interpretation favoured by some of the initiators of nationalization and there appears still to be a lingering prejudice against profits in nationalized industries. But experience has shown that nationalized management, like its counterpart in private industry, is not exempt from human fallibility and misfortune and that the only safe way to ensure a balance over a period of years is to aim at a profit in every year and thereby provide for the losses which will arise without being planned. From the point of view of the economic use of the nation's resources it would seem absolutely vital that nationalized management should follow — so far as is reasonably practicable — the criterion of marginal cost pricing, and record in their books whatever profit or loss this might entail. On ethical grounds also, one would have thought that profits in the hands of public enterprise, where they are used merely as an instrument of national accounting, would be as harmless as any profit can be.

The role of profits within the fuel industries in guiding the allocation of resources and acting as an incentive to competitive effort, is not always sufficiently appreciated. Within the framework of public service and responsibility to Parliament, profit and loss in the various sections of the enterprise supply a source of pride in achievement and a spur to further efforts, which is a key factor in maintaining efficiency. In this respect the present system of controlled average cost coal pricing which sets up a constant pressure for increased production and at the same time confronts the Coal Board with increased losses and reduced profits in the sectors of their enterprise where output has been raised, is bound to increase the difficulties of management.

The objection against profits is one side of the argument; the other is the apprehension that sections of the coal industry might record losses under free market conditions, and that local unemployment might result. This is, of course, the underlying motive behind all the various cartellization schemes which were introduced in this country in the 1930's and which still exist on the Continent. As these schemes are, in a sense, the forerunners of nationalization, one may expect something of their outlook to survive under the new organization. But conditions in Britain have changed radically

[5] 'Price Policy in the Coal Industry', by Professor A. Beacham, *Journal of Industrial Economics*, April 1953.

since the 1930's and the coal industry which was at that time justifiably regarded as essentially similar to the primary commodity industries overseas — such as rubber or grain production — in which contraction is extremely painful, has now been largely merged into the general labour market. The miners' contacts with urban communities outside the mining districts have greatly increased and the opportunities for alternative employment have been enormously widened, so that one can reasonably expect the coal producer — like any other worker — to face the risk of having to change his occupation.

FUEL PROSPECT

Having put forward the case for freedom in coal supply and rejected the arguments against it, one might be expected to give some idea of what would be the outcome in terms of supply and demand if government control were removed. To a large extent this question has already been answered by Professor Beacham's analysis which sufficiently disposes of any fear that there might be an increase in demand of such vast dimensions as would force the Coal Board to introduce a very substantial increase in price. But I think it is worth underlining the point that there are really two separate problems here: one is the shortage of coal in the winter season, of which the threat has been experienced in almost every post-war year, and the other is the long-term trend of demand. The fact that the long-term prospect has been largely misjudged on account of the experience of winter shortage is an additional reason for keeping the two issues separate.

The short-term crisis in the post-war years has centred on a margin of about 4 million tons of coal. Apart from the exceptional events of 1946-47, the two extremes are represented by the winter of 1950-51 which began with 15 million tons in stock, and was one of extreme coal shortage, and the winter of 1952-53 which began with 19 million tons in stock, and in which some degree of coal surplus emerged. Whatever one may think of the efficiency of the free market, one must surely agree that a margin of this order — representing some 2 per cent of national coal supplies — could soon be covered by the re-allocation of coal production resources and of stock-building and consumption patterns which would follow on the abolition of price controls.

In regard to the longer period, it has been suggested that the demand for fuel will rise in line with the increase in national wealth, so that, for example, a doubling of national income in a generation — the target recently suggested by Mr. Butler — would require a

doubling of fuel supplies in the same period. These estimates appear to have been based on historical experience in the decades when national wealth in the Western countries advanced mainly through the progress of manufactures. But in the period since 1929, when progress has been more largely based on activities which are less demanding in fuel consumption, the supply of energy in Britain and in the U.S.A. has advanced only about half as fast as the national income and this may well prove to be the pattern for the future.

Coal, as distinct from other fuels, appears to be in the course of a long-term contraction. Between 1929 and 1950 coal supply in the U.S.A. fell by 14 per cent, while oil and natural gas supplied the whole of the increase in fuel supply. The projected expansion of Britain's atomic power outlined in the government's White Paper,[1] together with recent trends in natural gas output in Europe, suggests that something similar is likely to happen on this side of the Atlantic. On the whole, the long term prospect for coal does not appear to substantiate the apprehensions of an indefinite rise in demand and of a corresponding rise in national fuel costs under free market conditions.

MANCHESTER

[1] *A programme of Nuclear Power*, Cmd. 9389, February 1955.

CAPITAL EMPLOYED

THE NEED FOR A DEFINITION OF CAPITAL EMPLOYED FOR USE IN MEASURING REMUNERATION EARNED

by C. L. PARKER

THE growth of Government interest in Industry has created a need to find a means of assessing what are fair and reasonable prices to be paid for the products of industry. It is required to establish a fair price level not only for goods which are the subject of direct contracts paid for by the Government, but also for those classes of goods and services the price of which the Government have reason to wish to control and those which have been referred to the Monopolies Commission.

During war-time, in the absence of free competition which could alone fix selling prices, the Government evolved a formula for limiting prices paid on direct contracts to prices which would yield a certain margin of profit above the reasonable cost of manufacture. Such contracts were usually termed 'cost plus' contracts. In the Third Report from the Committee of Public Accounts, Session 1953/54, these principles and formula have been confirmed for use with other types of contracts in the following words:

> The contractor's profit was to be related to the capital employed by him in carrying out the work, and the formula was designed to restrict the profit margin on fixed price contracts, including any appropriate allowances for efficiency and risk, to a maximum of 15 per cent on employed capital.

It was further stated:

> After the war the Treasury expressed the view that the formula should still be used by contract officers as a guide, though they recognized that it was no longer wholly appropriate to the circumstances and that difficulties might arise in negotiation, particularly where the Government was a marginal customer.

Prices actually paid by the Government have been checked back by means of this profit formula by relating a contractor's profit margins after adjusting for his rate of turnover to his 'capital employed'. Thus to establish what would be acceptable as a fair price for an investigated product it is necessary to ascertain:

(*a*) the cost of manufacture, including all appropriate overhead;
(*b*) the contractor's total sales turnover; and
(*c*) the contractor's total 'capital employed'.

.Total figures are usually used because in practice no product is produced in isolation. There are, of course, occasions when hived-off sections of a business might be considered as separate entities. By way of example of the working of the formula, if:

The agreed total price of a contract was	£50,000
The computed cost of manufacture was	£46,000
The contractor's total sales were	£3,000,000
The contractor's estimated total 'capital employed' was	£2,000,000

Then his profit margin is calculated as:

$$\frac{(50{,}000 - 46{,}000) \times 100}{50{,}000} \times \frac{3{,}000{,}000}{2{,}000{,}000}$$

$$= 12 \text{ per cent of Capital Employed}$$

Very little imagination is needed to see that there is a wide margin of error in this type of calculation. Furthermore, if a fixed percentage of capital employed is allowed, then the arbitrary nature of the other figures in the formula might cause considerable variation in the contract price ultimately allowed, and large sums of money might pass back or require to be paid. The problems of allocation of cost are many and varied, a fact which is ignored by the underlying assumption in the formula used in the example above that the business including the Government contract is homogeneous. Rarely is this assumption correct.

The frequent references to 'capital employed' in Government reports suggests that the meaning of this phrase is clear and unequivocal when, in fact, it is a term used very loosely by accountants examining a set of accounts. In different circumstances different figures extracted from the same balance sheet would pass as the capital employed but each accountant concerned would examine like with like using his same interpretation of the phrase for each of his comparative sets of figures. That there is a need to define capital employed for universal application by accountants and investigators is without doubt, but this need has not yet provided an authoritative answer.

Omitting the qualifying word 'employed' let us consider the nature of Capital in an effort to understand something of what is required for a definition. Capital consists of funds which are available for use in an industry in the expectation of thereby earning rewards or profits — it is the bread which is cast upon the waters. It is, therefore, best considered primarily not as what it is, but from whence it comes, that is the source through which it was obtained. Thus a limited company may have:

Subscribed Capital
Debenture Capital
Loan Capital
Retained Capital

Subscribed Capital would have come from the money subscribed by shareholders who had thereby acquired different rights to participate in the ultimate profits to be earned. As examples of shareholders' divergent interests may be mentioned:

Cumulative Preference Shares with a fixed rate of dividend assured during good periods or bad and priority of return of capital in the case of a winding-up.

Ordinary Shares with a dividend to be declared from time to time dependent upon results and with an interest in retained profits.

Deferred Ordinary Shares limiting the reward of the ordinary shares in good times and in such times taking a greater share of extra profits as a reward for the risk of foregoing a share of profits when these are somewhat lean.

Debenture Capital would have been put up by those who required a fixed rate of interest and possibly some degree of security of capital by a fixed date for repayment and/or a financial link with some part of the assets of the company.

Loan Capital might or might not be secured against certain assets, but its chief features are fixed interest rates and rather more elasticity of repayment.

Retained Capital would have arisen out of the past profits which have not been paid away in dividends, interest and taxation. In theory retained capital belongs to the ordinary shareholders and the existence of substantial amounts of retained capital usually coincides with a high quoted value of the ordinary shares. All retained capital is not recorded in a balance sheet in the balance of profit and loss account but is often shown as having been set aside for some definite provision of which a substantial sum is usually in respect of future taxation.

These notes on the sources of capital show clearly that although the sum total of subscribed capital is to be employed in one business, the different types of subscriber have each a different expectation of their own reward both as to time of repayment and rate of dividend and interest. Each apparently has a different conception of a fair and reasonable reward. Yet it is the combined capital which earns the total profit, and who can say which part is employed in a particular project?

To ascertain the net total capital employed by a limited company it is necessary to deduct from the subscribed and retained capital the amounts which have been reinvested in other companies and in subsidiary companies.

There are cases where companies can and do operate to some extent on the credit which is given to them by their suppliers: goods are sold for cash before payment is made for them. In such circumstances, the usual balance sheet item labelled 'creditors' is really capital, that is capital unwillingly subscribed and which will receive no tangible reward. Similarly, taxation accrued but not paid is actually in use as capital. It is, however, normal accounting practice in this country to omit these unpaid sources from a computation of capital, although at times they represent very considerable amounts.

This, then, is the capital which is normally shown on the liabilities side of a balance sheet of a limited company — shown as liabilities because thereby is recognized the debt which is due to the subscribers or lenders.

To find out how this capital is employed a further examination of the balance sheet is necessary. A balance sheet, of course, shows a position at a given moment of time and cannot therefore by itself show how capital has been employed. The usual practice is to average the figures in the opening and closing balance sheets of a period in order to obtain figures considered to be representative of that period. Some inquiry should be made, however, before averaging in this way to ascertain that the balance sheets are truly representative. For example, this method would be quite unsatisfactory where the trade was highly seasonal and the balance sheet date had been deliberately chosen in the off season. The capital employed between the dates of the balance sheets might in these circumstances be much greater than that shown in either of them and a third intermediate balance sheet might well be required. As the item of capital most likely to be affected by temporary changes is the loan capital, sufficient adjustment might be made by calculating the daily or monthly average loan capital and substituting this more accurate figure for the average of only the opening and closing loan capitals appearing in the balance sheets.

For further consideration of how capital subscribed has actually been employed reference must be made to other parts of the balance sheet. The assets side will show the sticks and stones into which the capital has been converted. It is a common misconception that a balance sheet shows the assets at their present worth. This is not so, as a balance sheet is an historical record of the investments to date

with or without suitable adjustment for assets no longer existing. To appreciate these points it is as well to examine an actual company balance sheet and to consider alternative ways in which the position of that company might have been presented at that time.

The following is an actual balance sheet slightly amended with much of the detail omitted.

A LIMITED COMPANY

BALANCE SHEET AS AT 31st DECEMBER, 195(4)

	£		£
Share Capital:		Fixed Assets:	
6% Preference Shares	250,000	Land and Buildings at Cost	700,000
Ordinary Shares	500,000	*Less:* Depreciation and Amortization	200,000
	£750,000		£500,000
Capital Reserve	150,000		
Revenue Reserves:		Plant and Machinery at Cost £750,000	
General	250,000	*Less:* Depreciation 500,000	
Profit & Loss A/c Balance	30,000		250,000
Future Income Tax	60,000	Trade Investments	5,000
4% Debenture Stock	600,000		£755,000
Bank Loan	200,000		
Creditors	400,000	Subsidiary Companies	270,000
Current Taxation	50,000	Current Assets:	
Proposed Dividend (Net)	27,500	Stocks	900,000
		Debtors	550,000
		Cash	42,500
	£2,517,500		£2,517,500

The position may be set out even more briefly as follows:

	£		£
Subscribed Capital	750,000	Fixed Assets	755,000
Debenture Capital	600,000	Subsidiary Companies	270,000
Loan Capital	200,000	Current Assets	1,492,500
Retained Capital	517,500		£2,517,500
		Less: Current Liabilities	450,000
	£2,067,500		£2,067,500

Now this Balance Sheet might have been varied by a number of window dressing arrangements which might be thought unimportant because they would not have altered the net total of capital employed. An example would be the paying off of some of the creditors out of cash just before the accounting date. More important, however, are the many alternative possible methods of accounting

for the above position which would vary the amount of the net capital employed as traditionally calculated.

It will be seen that the Land and Buildings have been written down by depreciation and amortization by £200,000 and Plant and Machinery have been similarly written down by £500,000. Presumably these amounts have been set aside out of profits over a long period, but these sums could quite legitimately have been taken to a general reserve or to an asset replacement reserve of some kind. Such a procedure would have added £700,000 to the apparent capital employed. It would, of course, have been possible to have taken part of this £700,000 to general reserve and part to depreciation reserve — at a reduced depreciation rate. These alternatives arise out of the fact that the Companies Act requires depreciation to be set out separately, but does not and indeed could not, specify how much depreciation should be written off different classes of assets. Again the Land and Buildings, Plant and Machinery have been given at cost, but there is no reason why these should not be given at a different figure such as a valuation, provided that the methods used to arrive at such valued amounts are clearly stated. Thus, for example, the Plant and Machinery could have been valued and stated at £1,000,000 and the excess of £250,000 shown as a capital reserve.

The net investment in Subsidiary Companies is very much a book figure. It is entirely a matter of Company policy as to whether accumulated profits are retained in the Subsidiary Companies' accounts or in those of the Parent Company. Consolidated accounts do give some further information but the whole subject of subsidiary companies is extremely complex, touching as it does the problems of foreign exchange restrictions and inter-company trading arrangements.

Stocks are likely to have been included in the Balance Sheet at cost or at something less. The something less would be a matter of discretion after consideration of either the market for possible sale or the market for possible replacement. Such differences, although possibly substantial, are not wholly relevant to the case now being discussed, since any alteration in value would also alter the amounts of profits earned in the preceding and following periods. In other words, an alteration to a stock value alters the amount of the earnings proportionately more than it alters the capital that is employed to earn.

It is perhaps worth mentioning, however, that stocks and other current assets are likely, because of their relatively rapid rate of turnover, to be valued in money at its current value. This is in direct

contrast to the value usually attached to fixed assets which, apart from revaluations, tend to be valued in the currency of the period in which they were acquired.

The figure in the Balance Sheet for Debtors might appear to the uninitiated to be a simple statement of amounts due — an inviolable figure. It is an accounting practice, however, before including debtors in published accounts to deduct an appropriate amount to cover such things expected as bad debts, loss on exchange and losses arising out of the freezing of foreign currency. These provisions deducted from debtors' balances vary from quite insignificant amounts up to very substantial amounts according to the ramifications of the trading of the organization concerned. Accounting practices vary in the methods of providing for these expected losses. Speaking very generally, if the expected losses are clear and specific, then the reservation against the known contingency is usually deducted from the total of the debtors' balances, but if the contingency is more nebulous and uncertain then it is a matter for decision after considering opinions as to whether the provision is made as a deduction from debtors or whether some addition is made to general reserves.

One might be forgiven for expecting that the last item in the balance sheet — Cash — would give no trouble. Is it not vouched exactly by the Auditors? In fact, the figure for cash is perhaps more easily varied than any other asset. A word with the Bank the day before the end of the year and the cash position in the above balance sheet could have been increased by £50,000 to £92,500 and the Bank Loan similarly increased by £50,000. It can be argued that cash as such in a balance sheet is not capital employed in a business and should therefore be deleted. Some available cash is both essential and inevitable, but it is a matter of expediency as to how much must be kept available, so that no clear-cut rules can be laid down. It is exceptional for an excessive amount of cash to be kept.

The balances due to Creditors are, as already stated, usually deducted in this country from total assets when computing capital employed. The withholding of payment or the temporary acceleration of payment to creditors can affect the cash and loan positions. On the other hand it can be seen that action taken to increase stocks by credit purchases does not alter the net amount of capital employed.

Using the balance sheet shown on page 138 the following are calculations, made by the two usually accepted methods, of the 'capital employed' as at the date of that balance sheet:

Method 1		£
Land and Buildings		500,000
Plant and Machinery		250,000
Stocks		900,000
Debtors		550,000
Cash		42,500
		£2,242,500
	£	
Less: Creditors	400,000	
Taxation	50,000	
Proposed Dividend	27,500	
		477,500
Capital Employed		£1,765,000

Method 2		£
Share Capital		750,000
Reserves		400,000
Profit and Loss Account Balance ..		30,000
Future Taxation		60,000
Debentures		600,000
Bank Loan		200,000
		£2,040,000
	£	
Less: Trade Investments	5,000	
Subsidiary Companies	270,000	
		275,000
Capital Employed		£1,765,000

These calculations, cross checking as they do, give the appearance of extreme accuracy. Some qualms may be felt about the complete deduction of creditors, taxation and proposed dividend as it might be argued that part at least of these balances are actually employed in the business although they attract to themselves no dividend, interest or other remuneration. The fact is, however, as the preceding notes have set out to show, that the whole calculation is little more than the roughest of estimates. Figures like these are being constantly used by investigators to test profit margins. The profit for the year is related to the average 'capital employed' as computed from the opening and closing balance sheets of a business to check

whether the profit earned is fair and reasonable or excessive. The profit is usually struck before deduction of taxation, but after charging depreciation. Income from investments is deleted and interest charged is added back. The whole calculation step by step is so deceptively reasonable. Thus a profit of £175,000 would be regarded as about right for the capital employed of £1,765,000, shown on page 141, being about 10 per cent thereof. The real investment was, however, very much greater as the foregoing notes will have indicated. It is most unlikely that the Land and Buildings, Plant and Machinery, maintained, repaired and serviced as they are in a going concern, could possibly be worth less in current values than their original costs which were shown on page 138 as £1,450,000. The whole of the figure of £700,000 written off as depreciation could therefore justifiably be added back, and more besides if the assets had been well maintained. Inflationary tendencies over the past years have considerably enhanced the values of fixed assets. One need only examine the values declared in a comprehensive insurance policy to confirm this view. A new investor setting up a business of the same proportions as the one considered could expect to use assets valued at, say:

	£
Land and Buildings ..	1,000,000
Plant and Machinery ..	900,000
Stocks	950,000
Debtors	600,000
Cash	50,000
	£3,500,000
Less: Creditors	500,000
Capital Employed	£3,000,000

A profit of £175,000 made by this business must be regarded as a very slim profit margin on a real investment of £3,000,000.

That the so-called reasonable margins of profit allowed by Government investigators are unrepresentative and therefore probably quite inadequate is borne out by published accounts. Four times a year *The Economist* summarizes the accounts published during the preceding three months. From these it is possible to calculate what would be the 'capital employed' by all British trade and industry. The period April to June 1954 included the results of 1,007 companies with a total 'capital employed' of nearly £3,400,000,000. The average net profit made by all of these com-

panies and expressed as a percentage of their 'capital employed' worked out at between 18 and 20 per cent. The margin between these limits is mainly due to the vagueness of provisions for contingencies included in many accounts. Bearing in mind that some companies will have made losses and others only slender profits, it is obvious that British industry does not accept 10 to 15 per cent of its 'capital employed' as a reasonable target profit.

The attempted application of the 'capital employed' principle to particular products or groups of products accentuates the errors inherent in the system. It is generally accepted as quite impossible in a given business to extract details of the extent to which actual items in the balance sheet are used in the manufacture and sale of a specified product. Consequently resort is made to the device of averaging by reference to the ratio of turnover of the specified product to the turnover of the whole business. Much work has been done on this problem in the United States but reports have so far done little more than show that different projects do in fact employ different amounts of capital. The methods of sharing jointly-used capital between different products remain too arbitrary to be regarded as an exact science.

Where multiple products are concerned can the capital cost of a building be properly shared between the products? Does any spare capacity rank as a capital charge against the first product produced or against the last product? — Against none at all or against all products? If all products using a facility are to be charged, what can be the basis of allocation? For example, if two identical machines were bought at different times at different prices, would it be correct to charge different capital sums to the identically similar products?

Clearly capital invested should receive a reward, and that this reward should be uniform is evidently desirable, but any attempt to restrict that reward will penalize the efficient who make the greatest use of capital. Healthy competition should set the price and the manufacturer who at competitive prices can make a high profit on his capital used, deserves to get it. It remains to him to observe and to calculate as shrewdly as he can the contribution to his profit made by the use of the various parts of his subscribed capital. In a world of changing money values his is no simple task and he is in need of sound unbiased research to aid him to obtain the greatest output from his capital at the lowest cost and to share the gains so obtained equitably between consumer, producer and subscriber of capital.

LONDON

THE PAINT INDUSTRY IN GREAT BRITAIN

A STUDY IN TECHNICAL CHANGE, MARKET FORMS AND SIZE OF FIRM[1]

by A. L. MINKES

Introduction

THE main purposes of this paper are to examine some aspects of growth and innovation in the paint industry in this country and its transformation from a craft to an industrial structure. A large part of economic theory is concerned with the influences which govern the size and specialization of the firm and the growth of an industry and it is with special reference to these that the following discussion is designed.

In the first part of the paper, the structure of the industry is outlined and the argument advanced that technological developments in the last thirty years have tended, in the main, to stimulate an increase in the size of the plant and firm. The effects of changes in technique have been offset by influences stemming largely from the nature of the demand for paint and of competition in the industry. In the second part of the paper, accordingly, these influences are discussed and set against the developments on the supply side.

It is customary in the industry to classify paints into two broad categories, viz. (*a*) building and decorating, (*b*) industrial paints. Output probably consists of approximately equal quantities of each group. There are wide variations between paints within each category depending on such considerations as type of surface to which the product is to be applied, the technique of application, and type of atmosphere and wear to which it is to be exposed.

I

GROWTH OF THE INDUSTRY AND IN THE SIZE OF PLANT AND FIRM

Censuses of production offer some evidence of the structure of the British paint industry and discussions with members of the industry have provided information of a more qualitative kind, e.g. as to characteristic specialization of firms. The present section is concerned mainly with the statistical information.

Employment and value of net output in the industry have both grown substantially since the years preceding the first World War. Part of the development in the paint industry has been the substitution of new products for old and changes in quality, with

[1] The writer, while taking full responsibility for this paper, wishes to thank those members of the industry who have so generously accorded him their time and assistance. He is also indebted to his friends for their comments on earlier drafts.

TABLE I

EMPLOYMENT AND OUTPUT (AT CURRENT PRICES) IN THE PAINT AND VARNISH INDUSTRY IN 1907, 1924, 1935 AND 1948*

	No. of establishments†	*Numbers employed (thousands)*	*Value of Net Output £'000*	*Nos. per establishment*	*Net output per establishment £*
1907	na	13.8	2,744	na	na
1924	na	18.5	7,350	na	na
1935‡	286	22.2	9,685	74	339
1948	363	32.9	30,772	91	848

* Assembled or computed from Censuses of Production. The figures, while not always strictly comparable through the years, probably compare reasonably closely. Figures are also available for 1949 or 1950 but as those so far published do not cover as much ground as the 1948 Census, the latter is used in this section. The general picture is not greatly affected by this.

† Employing more than 10 persons per establishment.

‡ See also Table II.

divergent rates of growth of different lines.[2] Calculations of changes in real terms are, for this as for general reasons, very difficult particularly over a fairly long period. It has been estimated, however, that for the industry as a whole (i.e. all establishments), the output of paint and varnish in 1948 in terms of (1935=100) was 171.0 or 160.2 according as to whether 1935 or 1948 weights were used.[3]

For similar reasons, it is extremely difficult to establish how the industry has grown in relation to the chemical and allied trades as a whole. It appears probable that the paint industry increased relatively to chemicals before the war, in terms of employment and output; since 1935, however, expansion has been faster in chemicals as a whole, the corresponding indices being 161.7 and 179.1 or 168.9.[4]

In addition to the 363 establishments quoted in Table I, there were in 1948 a further 244 below the Census limit of numbers employed. These employed a further 1346 persons. As these constitute a rather special problem, they are not, unless specifically mentioned, included within the industry for the purposes of this paper.

There is a fairly high degree of concentration of employment and output in the industry, about 30 per cent being in the 15 establishments which in 1948 each employed over 400 persons. There

[2] For example, while output as a whole fell in 1933 (see statistics of volume of production in the 1935 Census of Production), the output of cellulose lacquers, varnishes, etc., and liquid driers and thinners, rose sharply.

[3] B. C. Brown, 'Industrial Production in 1935 and 1948', *London and Cambridge Economic Bulletin*, December 1954, Table 3. The index of employment is given as 144.6. The implied price index is computed as 245.2. Prevailing opinion in the industry is certainly that real net output has grown substantially since 1935.

[4] B. C. Brown, loc. cit.

TABLE II

EMPLOYMENT AND NET OUTPUT IN 1935 AND 1948 ACCORDING TO SIZE OF ESTABLISHMENT

Numbers per Establishment	1935*				1948			
	Number of Establishments	*Per cent*	*Per cent of Total Employment*	*Per cent of Net Output*	*Number of Establishments*	*Per cent*	*Per cent of Total Employment*	*Per cent of Net Output*
11– 24	134	39.2	9.3	7.9	109	30.0	5.8	6.4
25– 49	87	25.4	12.4	11.1	98	27.0	10.7	10.4
50– 99	63	18.4	18.0	17.5	76	20.1	16.3	16.9
100– 199	35	10.2	19.1	19.0	46	12.7	19.5	20.8
200– 299	6	1.8	6.1	9.1	12	3.3	8.7	8.0
300– 399	5	1.5	7.4	8.0	7	1.9	7.1	7.7
400– 499	5	1.5	9.0	8.4	na	na	na	na
500+	7	2.0	18.7	19.0	na	na	na	na
400– 749	na	na	na	na	11	3.0	19.3	20.3
750– 1,499	na	na	na	na	4	2.0	12.6	9.5
TOTAL	342	100.0	100.0	100.0	363	100.0	100.0	100.0

* The figures for 1935 and 1948 in Table I were taken from Censuses of Production for 1950, 1949 and 1948, Summary Tables Part I, H.M.S.O. 1953, Table I, p. 4. The 1935 figures in this Table were taken from U.K. 5th Census of Production, 1935, Part III, Table II, p. 347. The differences appear to be due to changes in classification; for example, the above figures include establishments wholly or mainly engaged in the manufacture of pigments.

are a considerable number of medium-sized establishments; for example, 122 of these in the employment range 50-199 account for over one-third of the employment and value of the output of the industry. But the statistics of establishments understate the degree of concentration in firms; this is true, not only of the figures for large plants but in the medium and small ranges also, since firms may be large financial aggregations of relatively small technical units.[5]

The statistics and discussions with members of the trade suggest that the last generation has witnessed a notable growth in average employment per establishment, in the number of large establishments, and in the size of the firm. While the figures do not permit a wholly satisfactory comparison through time, it appears probable that there has been, since 1935, for example, a decline in the number of establishments employing between 11 and 24 persons, and an increase in other ranges. Whereas in 1935 there were 23 establishments with 200 or more persons employed, in 1948 there were 34. In the range 200-299, the number of establishments rose from 6 to 12. In the range 300 and over the corresponding figures are 17 and 22 respectively, and for 400 and over, 12 and 15 respectively.

This expansion of the unit appears if the output of firms or establishments be taken as the criterion.[6] It would also seem, judging from the records and from discussions with members of the industry, that the largest firms have grown substantially and have extended their interests. In the 1920s and 1930s, for example, there were a number of important acquisitions and amalgamations. In 1926, for example, Pinchin Johnson acquired the business of Docker Bros.; in 1929 further interests were acquired on the Continent, particularly in Italy. In 1930, the Company acquired the balance of the share capital of two English subsidiary holdings; it extended its Continental share holdings, and obtained a controlling interest in a leading paint and varnish firm in the Argentine. Lewis Berger and Sons Ltd. is now simply the holding company of the Berger interests, which extend to Commonwealth countries and to France. The firm has an interest in Styrene Co-Polymers Ltd., developed together

[5] On the degree of concentration in 1935 see H. Leak and A. Maizels, 'The Structure of British Industry', *Journal of the Royal Statistical Society*, Vol. CVIII, Part II, 1945. It appears to have been less in paint and varnish than the average for all trades and for chemicals in particular.

[6] It is very difficult to make a wholly satisfactory comparison of output per establishment (*a*) because of changes in classification of size-intervals between Censuses and (*b*) because changes in value of output are partly the result of changes in prices and not merely in volume, and these may not have been uniformly distributed between firms. The changing ratio between invested capital and numbers employed (see post, p. 150) limits the usefulness of employment as an indication of size. But the growth in the number of larger establishments and in employment per establishment appears to have been parallelled by increases in size as defined by output.

with Petro-Chemicals Ltd., which manufactures raw materials under Berger patents for the styrenated synthetic emulsion paints. The Chairman of the Berger group, Mr. Thomas Lilley, recently announced that Pinchin Johnson and associates have agreed to come into Styrene Co-Polymers Ltd. The 1920s saw the entry of I.C.I. into the paint industry, to which their attention had been drawn, in part at least, by the use of nitro-cellulose for the manufacture of the new product, cellulose lacquers.

These are only some examples of what was a fairly substantial development. Together with this trend, there went a considerable growth of production by British firms inside the British Commonwealth but also in other countries, for instance in Latin America.

It seems, therefore, that there has been a rather rapid growth of the big firms. This has probably been true of the majority of industries during the same period. Nevertheless, the structure of the industry, i.e. relative importance of large, medium and small units, appears to have changed rather little. In sum, the influence of developments in paint technology and formulation, in the gains accruing from controlled research and in the secular growth of large-scale national and international demands has been lessened by countervailing influences. These arise partly from problems of excess capacity in the industry but mainly from the character of the markets for paint. It is with the assessment of these various factors that the remainder of this paper is concerned.

II

FACTORS ON THE SUPPLY SIDE INFLUENCING THE SIZE OF THE FIRM

Until the end of the first World War, the industry was almost wholly craft in method and outlook. Manufacturers and craftsmen knew that certain combinations of raw materials, developed by trial and error, treated in certain ways, gave them results which they were willing to accept as satisfactory, and that others did not. They were frequently unaware of, and unconcerned with, the chemical processes involved. It was highly unusual for a firm to employ a trained chemist; where there were chemists, their status was relatively low and their sphere of competence very narrowly defined. They seem to have been regarded as testers of finished products and hardly at all as initiators of new developments. Numbers of paint manufacturers had had some scientific training, but the main element was practical experience rather than theoretical knowledge. It is only in the last generation or so that some manufacturers have begun seriously to investigate why particular combinations of raw materials treated in particular ways produce given results in the final product.

Only during this period has deliberate experimentation based on known or consciously sought scientific relationships entered significantly into the manufacture of paint. The elements of craft knowledge and technique are, indeed, still immensely important in the industry, even in those firms in which the influence of chemical ideas and methods is greatest.

The great extension of the uses for which paint is required, the increasingly rigorous characteristics which may be specified and the pressure of scientific development within the industry and outside it, in the chemical trades, in plastics and in mechanical engineering, have, however, changed matters very considerably. They have exerted great influence on the policies of firms and on the structure of the industry.

There have been numerous technical developments and not everyone in the industry would assess them in the same order of importance. Those to which reference is made in this paper would, however, universally be considered as among the most notable.[7]

(*a*) Manufacturing processes: the application of the ball-milling principle to paints. In contrast to other types of mill, grinding in a ball-mill is, in the paint industry, a wholly automatic process in a rotating drum containing porcelain, stone, or steel balls which cascade through the liquid.

(*b*) Formulation of the product: increased chemical treatment of raw materials such as linseed oil, and the development of synthetic materials, particularly of synthetic resins.

(*a*) *Changes in Manufacturing Processes*

Apart from advantages arising from the thoroughness with which paint can be ground in a ball-mill, the introduction of this machine tends to reduce unit cost of production through effecting substantial economies in labour and materials. To the economies of large-scale production which are experienced in paint manufacture with other types of equipment, can be added, accordingly, the lowering of the cost schedule by a change in technique. It can also be argued that costs tend to fall faster[8] for an increase in size of ball-mill than for an increase in size of roller-mill. Furthermore, there are two aspects to the question of capacity, viz. the size of the ball-mill and that of the throughput of a homogeneous or reasonably homogeneous output. There is, in other words, the economy to scale from a growth in the

[7] On paint technology in general see: Oil and Colour Chemists' Association, *An Introduction to Paint Technology*, March 1949; W. von Fischer (Editor), *Paint and Varnish Technology*, New York, 1948, Chapter 1; Heath and Hetherington, *Industrial Research and Development*, 1946, Chapter 15.

[8] See post, p. 152, footnote, for a comment on the shape of the cost curve.

size of the technical unit or plant and falling costs from larger orders. It is expensive to clean out a ball-mill; a figure of £25 in labour costs has been mentioned for a large one;[9] the unit effect of this on a gallon of paint can be very greatly reduced if the successive batches of paint being fed into the mill are the same or very similar or in an appropriate gradation of colour, e.g. white, cream, stone, etc.

Within fair limits, direct labour costs do not increase proportionately with the size of a mill; with roller-mills an operative is able to supervise a somewhat larger as effectively as a smaller machine and the problems of filling and unloading do not grow appreciably, if at all. There are, however, narrow technical limits to the size of roller-mill, and to the length of time it can run without undue heating of the rollers. The automatic character of the ball-mill means that it requires much less attention than other types of mill; the amount of labour time consumed in charging and unloading the ball-mill is considerably less than the time needed for the many more operations required with roller-mills.[10] During grinding, no supervision at all is needed. There is also an elimination or reduction of requirements in terms of skills, both because the grinding takes place without the intervention of human judgment and because the larger size of batch which can readily be handled in a single operation reduces the number of times per quantity of output at which colour-shading has to take place.[11] This is of considerable importance since, although in the past the time required to learn the trade of colour-shading may have been over-estimated, the problem of obtaining enough colour-shaders has been noticeable.

The automatic character of the process means, also, that grinding can continue throughout the night without the use of labour. The rate of output per unit of time appears to be significantly higher than in other types of mill[12] and combined with its ability to run overnight, its capacity is doubled or trebled (the exact proportion

[9] *Paint, Oil and Colour Journal*, January 29th, 1954, p. 281.

[10] Moreover, there may be a saving in that the ball-mill, unlike the roller-mill, combines part of the mixing process with grinding.

[11] It raises the importance of skill since errors would mean the spoiling of larger quantities, i.e. the size of potential capital loss is higher.

[12] For given quantities of given paints in given colours, for given size of mill and at a given rate of wear on the lining of the ball-mills. In one firm, the following figures were supplied of hourly rates of output which might be expected from different types of mill:

flat-stone mill:	perhaps 2-3 gallons
roller-mill:	perhaps 12-15 gallons
ball-mill:	perhaps 15-25 gallons

and a 1000 gallon ball-mill could grind its charge in 36 hours, i.e. a rate of almost 28 gallons an hour.

Elsewhere, it has been suggested that such high rates are possible, without extreme wear, only in steel ball-mills and even then only with dark colours, since the lighter colours would tend to be discoloured by the steel in very rapid grinding.

depending on the length of the working day for labour). The initial purchase price of a ball-mill up to considerable sizes is no greater, and for some sizes is lower than for roller-mills; even the largest ball-mill is cheaper than the most expensive roller types. Therefore, it would be necessary for the rate of depreciation of a ball-mill to be two or three times that of a roller-mill for its increased effective capacity to be offset by amortization costs; as this is not the case, there is no loss and there is perhaps a considerable gain in capital costs measured over the true working life of the machine.[13]

A further advantage deriving from continuity of process is greater flexibility of working; the machine can be set to work late in the day without interrupting colour-shading by an overnight break.

There are gains on the cost side through substantial economies in the use of materials; as these constitute about 63 per cent of the gross value of sales,[14] such savings are even more important than wage and salary costs, the corresponding figure for which is about 15 per cent.[15] These raw material costs may represent at least 70 per cent of Factory Packed Cost.[16] During manufacture there are very considerable losses of raw materials through spilling, adherence to containers and plant, and by evaporation of volatile liquids during mixing and grinding. These vary with the nature of the product and the size of batch. According to the experience of one manufacturer of paint,[17] in batches of under fifty gallons of specialized products, for example, the loss is 8 per cent on colours in oil, 6 per cent in enamels and in clear and pigmented cellulose lacquers; on no product is it less than 3 per cent. But these figures fall very sharply once the batch reaches 100 gallons; at 500 gallons, a further fall is shown, sometimes greater proportionately than in the first range.

Increase in the size of batch, therefore, lowers unit costs of raw materials and it is likely that the ball-mill is particularly advantageous here because, for instance, grinding in an enclosed surface eliminates loss from evaporation.

It seems also that there are other economies of large-scale production; for example, power costs do not increase proportionately with

Nevertheless, three things seem to emerge:
(*a*) In terms of 'days' the possibility of continuous production shortens production time for a given output.
(*b*) There has been for a considerable range of production a substantial increase in the rate at which an output can be mill-processed.
(*c*) At the least, the ball-mill grinds its charge in larger uniform single batches.

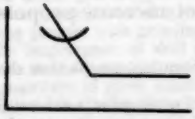
[13] Maintenance costs are small in ball-mills and probably smaller than in roller-mills.
[14] Including containers and packing materials, which account for over 10 per cent.
[15] The higher proportion being salaries.
[16] *Accounting and Costing in the Paint Industry*, The Paint Materials Trade Association, 1952, p. 12.
[17] Ibid., p. 16.

size of mill. Since a growth in the size of the ball-mill is not inhibited by problems of supervision as with other types, it seems likely that this machine is superior in this context as in others to alternative kinds of mill.

The above analysis has been, to a great extent, qualitative; to express it in quantitative terms would require detailed costings of many firms over an extended period. In view of the variation in the product and changes in past years, moreover, it would be a delicate task to assign exact quantitative weights to such costings. Such data as have been quoted and the general views of businessmen and works personnel suggest that the analysis is substantially correct. There is an important qualification, however, which helps to explain why many smaller firms have little or no use for ball-mills. Since the wage-cost of cleaning a ball-mill is relatively high, its advantages are greatly reduced for small sizes with small orders. It is possible, in fact, that the cost schedule of a ball-mill in such circumstances might lie above that of a roller-mill. But once the size rises, or once, with a given size ball-mill, the quantity of homogeneous or reasonably homogeneous output increases, it can be expected that costs fall below those of other types of mill.[18] In other words, the cost schedules of ball-mills and roller-mills diverge and since the former may at some point be higher than the latter, it follows that costs fall faster with growing scale in ball-milling than in roller-milling. The growth in scale may be compounded of both the technical unit, i.e. the mill, and the throughput, i.e. the size of a continuous output.[19]

[18] Some experts argue that even for small outputs it is better to use ball-mills. They say that the argument about washing-costs applies *a fortiori* to roller-mills and that the latter are, in any case, very inconvenient.

[19] The preceding analysis of cost conditions has been made in terms of the comparative advantages of the roller-mill and ball-mill, and, by extension, of plants utilizing these different techniques of production. A plant might, in principle, be employing both, and its cost-curve for output as a whole be compounded of both. Or, the situation might be represented as a process of shifting from one technique to the other as the size of order varies, e.g.



with appropriate conditions for changes in scale.

It is not intended to be definite about the precise shape of the curves; it is not essential to the argument to be so. On the whole, it seems possible that costs will eventually rise with roller-mills on account of inconveniences of working (both in the short- and long-run). With ball-mills, on the other hand, it seems possible that the short-run cost-curve will flatten out and that for all likely sizes of mill, falling costs may be experienced in the long-run (given that all installed equipment is appropriately adapted).

In consequence of these advantages, the use of the ball-mill has become very widespread in the industry and in recent years bigger mills have been manufactured. The I.C.I. site at Slough or the Berger plant at Chadwell Heath bear witness to the growth in employment of such mills.

To what extent do these developments stimulate the growth in size of plant and firm? Many smaller and medium firms are equipped with some ball-mills and as the capital cost is much the same as that of roller-mills, it might seem that as the latter approach the limits of physical life in a plant they would be replaced by ball-mills. But if it be true that the cost schedule of small outputs in small mills lies above that of roller-mills, as seems likely, then there is still room for the latter since many orders, particularly for contract decorative paints or industrial paints for local firms, are small and heterogeneous. The nature of the demand for paint is such that it is not always possible to use that size of plant in those runs which it would be most economic to use if they could be employed at full capacity over extended periods. Nevertheless, since the introduction of the ball-mill appears to result in an increase in invested capital relative to numbers of operatives, many smaller and medium firms have equipped themselves with medium-sized mills, say 250-500 gallons in rated capacity, and benefit from the reduced need for skilled operatives in the grinding processes. This has occurred in the industry to some extent. As there are special economies of scale in ball-milling, however, which grow with size of mill and continuing throughput, the effect of this technological development is to increase the technical optimum size of plant. Since units which are already relatively large and wealthy are better able to undertake orders which justify the use of extensive large-scale capacity, involving the employment of considerable numbers of ball-mills, there are cumulative advantages to scale. For large firms are to some extent protected against new entrants in fields requiring big units, by imperfections in the supply of capital as between larger and smaller firms,[10] and by established connections with major buyers who have to be convinced that their paint suppliers can meet required technical standards and delivery dates.

On the other hand, it is sometimes argued that further reasons account for the survival of roller-mills: (1) that for high quality paints they are sometimes thought desirable because some firms consider that they grind more effectively, (2) that firms will not bother to replace existing equipment until they are driven to it.

There have been other developments in equipment which add to

[10] There may also be the fear among small firms of weakening of (family) control.

the effects already described, e.g. very large kettles for cooking varnish, which are associated with falling unit labour costs, and expensive machinery for sifting paint.

(*b*) *Developments in the Product*

It is in the realm of paint formulation that the most significant technical developments have occurred in the industry. It is here that the transition from craft outlook and habits is most evident. For it is in formulation that increased knowledge of the relevant chemical reactions has had the fundamental effect of making possible the manufacture of what have been called 'tailor-made' paints. Improvements in manufacturing technique, the extension of chemically informed formulation of paints, and superior methods of testing performance, have combined, in fact, greatly to increase the degree of control which producers are able to exercise over the performance of the product.[21] This growth of control works also in the direction of stimulating further developments, since it is based on accurate knowledge of chemical processes. Furthermore, because of these developments, manufacturers of paint are better able to meet rigorously the specifications laid down by buyers.

The introduction of the synthetic resins has meant that a much higher degree of chemical uniformity in the product than had hitherto been possible can now be ensured. When the industry was wholly or very largely dependent on natural resins (and on other raw materials to which relatively little special chemical treatment was applied), it was much more difficult to ensure uniformity of successive batches of paint. This is not to suggest that craft methods entailed bad results but that greater scientific knowledge is likely to yield much greater precision and to open the minds of those concerned with making paints to a greater variety of possibilities.[22]

The introduction of the synthetic emulsion paints, for example, was made possible by the development of new synthetic raw materials. Because these paints are easily applied and can be washed and even scrubbed, they are in a strong position in relation to distempers, although they are much more expensive. Moreover, they are extremely quick-drying, and can be applied to new cement. There are limits to the degree of humidity in which they can dry but some

[21] An invaluable source of information in this context is the contribution by members of the Oil and Colour Chemists' Association to the annual *Progress Reports in Applied Chemistry* published by the Society of Chemical Industry; the section on paint and kindred products is reprinted as a separate report by O.C.C.A.

[22] Natural resins are still used in great quantities but synthetic resins continue to grow in relative importance. The general point relates also to the increase in the chemical treatment of natural raw materials.

of them, at least, are being used to some extent for outdoor purposes. They cannot at present be made with a high gloss. They are at present used mainly in building and decorating rather than as industrial paints.[33] Their relative importance cannot yet be fully assessed, since they have hardly been developed long enough. But the development is a good illustration of the analysis.[34]

The introduction of the chemical element into the paint industry has led to a substantial development in the manufacture of chemical media for paint. The production of synthetic resins by chemical firms and by firms specializing in resins and kindred products is a notable instance of this.

The larger firms in the paint industry and a number of those of medium size have developed their own plant for the manufacture of some part of their requirements in synthetic resins. The number of different specifications of resins which are manufactured runs into hundreds, some of which are required in small quantities and at short notice. It is an advantage to be able to satisfy special requirements rapidly but it would be uneconomic for those paint firms who have gone into the field to confine themselves to those for which their demand is least substantial and frequent. This vertical integration represents the penetration by paint firms of a narrow sector of chemicals rather than the reverse process of chemical firms going forward into the manufacture of paint. Yet there are firms in the field of industrial chemicals which would presumably be capable of integrating forward into the paint industry.[35] I.C.I. is an example of a firm which has done so, but even here, although I.C.I. must unquestionably have been influenced by their interests in chemicals, and have benefited in the paint industry from these interests, the initial impetus did not come entirely from this cause. I.C.I. came into the manufacture of cellulose lacquers because nitro-cellulose, which is used for these, descends from gun cotton which Nobel Industries made for explosives in the first War. The technical problems involved and the chemical nature of the solvents used brought I.C.I. into cellulose lacquers and thence to undercoats

[33] Nevertheless, they have so far had a significant influence in the industry and are of considerable interest in a time when the increased number of amateur decorators of their own homes is attracting growing attention from paint firms. For a valuable discussion of these paints, see 'Resin Emulsion Paints – An Appreciation of their Present Position and Future Trends', J. H. W. Turner, *Paint Manufacture*, August 1953.

[34] Another interesting example is the development of phthalocyamine (monastral) blue, by I.C.I., which is superior to the prussian and ultramarine blues in possessing good resistance to both alkali and acid.

[35] Forward integration by suppliers of raw materials for paint would not be a novel circumstance. In the nineteenth century the lead manufacturers who were wealthy went forward into the paint industry in which firms were small. Lead was then much more important than nowadays in paint.

based on drying oil. Subsequently, the Paints Division of I.C.I. has expanded very substantially.

Before considering why other chemical firms have not gone into the mixing of paint, it is pertinent to examine why some paint manufacturers have gone into chemicals via synthetic resins.

Manufacturers say that they can make these more cheaply than it would be possible to buy them from chemical or specialist resin firms. It is not very difficult to develop the plant, transport costs may be eliminated or greatly reduced; to the extent that natural resins are used to make the synthetic products, there is a valuable integration with the general purchasing of raw materials by the firm. Since costs of materials bulk so large in paint, these considerations might have some considerable importance. The gain in costs, however, is not very substantial; it is doubtful if it normally exceeds 5 per cent. This is true for those resins in fairly general use. It seems probable that there are economies of scale in the manufacture of synthetic resins so that paint firms could hardly manufacture all their requirements in resins economically unless they could dispose of a surplus. It is possible that the recent association of Pinchin Johnson with Berger's in Styrene Co-Polymers Ltd. is partly explained by the desire to secure outlets for a growing scale of operations. Need for capital and the increased importance of a paint firm with the chemical resources and research facilities of I.C.I. might be related factors in this context.

Own manufacture of synthetic resins ensures supplies and independence of other sources. This is a highly significant consideration since it involves ensuring adequate quantities and flexibility in circumstances in which improvement in performance of the product is very important. The incentive to safeguard supplies may well have been strengthened by difficulties experienced during the war in respect of imported natural raw materials. What is more important, however, is that some paint manufacturers appear to be thinking increasingly in terms of building the paint round the synthetic resin so that close control over this, and access to a plant owned by the paint firm itself, facilitate experimentation and give greater flexibility.[28] Many paint firms had already had considerable experience in the treatment of natural resins and the processing of linseed and other oils. The larger firms who now make certain synthetic resins for themselves were able to utilize their technical resources and the skills acquired in these older processes for the kindred techniques of manufacturing the new products.

[28] Similar influences may operate in respect of pigments. Moreover, some paint firms, such as Berger's, began as manufacturers of dry colour.

As far as the chemical firms are concerned, the strongest reasons against a venture forward into the manufacture of paint appear to be twofold. By the time that complex chemical products of the chemicals industry acquired importance for paint, there were already many firms in the paint industry with strong attachments of goodwill between them and their customers. As the chemicals industry has expanded its output of products for the paint manufacturers, a number of the latter have developed in scientific character and to them has been added the weight of I.C.I. For other chemical firms to begin to make paints would involve entering an established field and competing against their own customers for paint-making products such as resins. As regards paint firms, the advantages of integration back to the synthetic resins which appear to accrue to those firms able to bear the capital outlay tend to favour a growth in the size of the firm.

There has long been a tradition of investigation and experimentation in the paint and varnish industry.[17] But as with other developments, the establishment of modern research laboratories, staffed by trained chemists, and enjoying substantial prestige in the order of things in a paint factory, has been a feature of the last quarter of a century. All that has been said so far about the importance of formulation and control bears on the value of good laboratories with competent scientists. Bigger firms are likely to be better able to employ more chemists and to pay salaries and offer facilities and opportunities which are likely to attract the ablest chemists.

There are three general considerations which level up the relative positions of larger and smaller firms:

(*a*) In certain applied problems, firms can obtain the help, on a paying basis, of the industry's Research Association, which is located at Teddington.[18] Such activities are only part of the work of the Association, the primary function of which might perhaps be regarded as the pursuit of fundamental research. But it does assist firms by, for example, carrying out special tests for them.

(*b*) Much of the research carried out in the industry might be termed 'workshop' research into applied problems, e.g. reaction of the product to stoving at high temperatures, rather than what might be called pure science. It is, in other words, applied and rather specific science, which can be carried out by a few chemists and

[17] Examples of this may be found in the histories of firms. In *Proud Occasion*, for example, published in 1947 by Thornley and Knight on the 150th anniversary of the firm, it is recorded that Edward Thornley, a son of the founder, carried out numerous experiments in varnish making. He was in fact burned to death in 1835 while making varnish, probably during the course of one of his experiments.

[18] On the Paint, Colour and Varnish Manufacturers' Research Association, see, for example, *Co-operative Industrial Research*, R. S. Edwards, 1950.

technical personnel, with limited equipment, all of which are within the financial reach of many medium-sized and even quite small firms. Weathering tests can be carried out on simple stands on flat roofs, humidity tests with quite simple equipment. A few chemists can be attracted by paying relatively high salaries, the aggregate cost to the firm being quite small.

(*c*) Firms which cannot afford to undertake much research or development themselves derive a kind of external economy from progress in the manufacture of varnish, resin, and other media by their suppliers. They will also often receive advice, for example from specialist resin firms, on the use of the products.

Nevertheless, the increasing development of scientific equipment, such as machines for testing weathering, the greater prospects of advancement offered chemists by large enterprises and the tendency for the line between pure and applied science to become ever fainter, appear to weight the balance on the side of bigness. Even if there were net disadvantages to large plants, the optimum scale of firms in the sense of large financial units would be greater. Firms which are already large can more readily expand in this way than small firms because of the limits imposed to the latter by indivisibilities. To make the developments more economic, however, it seems quite likely that the major paint firms will have to expand the scale of their chemical operations.

In sum, there have been powerful influences on the conditions of supply, towards greater size of plant and firm, and closer integration of the stages of manufacture. The general principle of vertical integration operates with varying force. For example, there are some firms who make all but the large sizes of their own paint tins. This is not characteristic of the industry, nor does it seem likely to become so unless independence of an outside supplier is thought very much to outweigh the cost advantages which a specialist firm must surely possess.[18] On the other hand, integration forward into the retail trade in paint is becoming a very significant matter.[19]

The foregoing discussion has been in terms of the growth of the firm through vertical integration. This is not the only aspect to be considered. There has long been a tendency for paint firms to be multi-product firms and to integrate laterally through manufacturing kindred products. Many paint firms are engaged in the manufacture of products such as various types of flooring, wood preservatives, etc. In this way, often using the same materials and similar

[18] The labelling of tins and direct printing on to them is, however, another matter and may well become more important.

[19] See post, p. 167.

techniques to those used in making paint, firms have been able to utilize surplus capacity which the heterogeneity of many small orders tends to leave in the paint departments. They have also been able to accumulate funds to help them to provide resources to set against the strain of heavy working capital requirements on the paint side of the business. There has also been a certain amount of lateral integration with other fields, such as plastics, with which the development of the synthetic resins has made the paint industry more akin.

III

FACTORS ON THE DEMAND SIDE INFLUENCING THE SIZE OF THE FIRM

Income, Prices, and the Demand for Paint

(a) Income elasticity of demand

The factors which determine the volume and composition of the demand for paint are numerous and complex.

The demand for paint is derived from the output of other goods and hence is closely affected by fluctuations in the general level of production. The level of average real income is one of the important determinants of the aggregate volume of demand for paint. This is so because high and rising real incomes reflect growth in the volume of output and frequently of industrial output, the expansion of transport services, an increase in the variety of products enjoyed by consumers, and a more 'luxurious' view of what constitutes 'comfort'.[31] In areas of relatively high average real incomes, such as Great Britain and the U.S.A., there appears to have been a secular rising trend in the aggregate demand for paints and a great spread in the range of products which require coating. This is evident on all sides, with motor cars and other vehicles and the whole growing area of durable consumers' goods.

Paint manufacturers are inclined, accordingly, to place great stress on the income elasticity of demand for their products. It is sometimes argued that price elasticity of demand is small[32] and usually likely to be of less importance than elasticity with respect to income because in many products paint forms only a relatively small proportion of total costs. According to Mr. Sandys in the House of Commons in May 1945, for example, paint and distemper were responsible for only £7-£12 in the total cost of building a house.

[31] For a discussion of these influences in the development of paint production and consumption in Latin America, see chapter by Skov in *The Industrialization of Latin America*, Hughlett (Ed.).

[32] See, for example, *Paint Federation Journal*, May 1952. A Message from the President (H. W. G. Bidgood, Paints Division I.C.I.) '. . . a mere reduction in the price of paint does not of itself materially increase the amount consumed in the country.'

There is probably a good deal of justification for this stress on the high income elasticity of demand for paint. But the history of the industry and of the relative positions of firms of different sizes is one in which the demand for paint and the prosperity of firms have ridden on a sea of compensating waves.[33] Several contrasting influences offset somewhat the effects of fluctuations in the general level of activity. In this context, the experience of the pre-war years provides instructive data. There are numerous instances illustrating the countervailing elements in demand as determinants of prosperity and policy in the industry. There was, for example, the rise in the 'high-class decorative trade' to set against the fall in demand from the basic industries.[34] In the early 1930s, when industrial production had fallen off, the level of building, on the whole, was well maintained: it increased more rapidly, moreover, than did industrial production. House-building in England and Wales fell off sharply in 1931, largely because of the virtual cessation of State-aided private building. But house-building in general recovered very well in 1932 and 1933 and then new building increased extremely rapidly.

The violent drop in the 1930s in tonnage commenced in shipbuilding (and, with a lag, in launchings), and the relative stagnation which persisted throughout the whole decade, appears to have been at the root of an agreement on prices among about sixty firms engaged in the manufacture of marine paints, which is a particularly highly specialized form of paint manufacture. Some compensating element from other branches of paint-making, however, is referred to, for example, in the pre-war Reports of the International Paints and Compositions Company; the main business of this firm was the supply of anti-fouling and anti-corrosive composition and ships' paints.[35]

It is often possible to shift from the production of one type of paint to another and there were a number of areas of expanding demand during the period. From 1926 to 1937 inclusive, for example, output of cars and commercial vehicles, except for minor cases, expanded rapidly.[36] Moreover, with the general increase in industrial production, after about 1933, there were specific increases of considerable

[33] Some indication of this is given by the statistics of volume changes in the early 1930s shown in the 1935 Census of Production.

[34] See, for example, the Report of Pinchin Johnson and Associates for 1932 in *The Times*, March 22nd, 1933.

[35] In the 1931 Report (see *The Times*, March 19th, 1932), it was stated that the Company was the largest in the world in the field of ships' paints and compositions. In the Report for 1927 (see *The Times*, March 16th, 1928), it had been stated that the Company was painting about one-third of the total world tonnage of shipping. In that year, it had purchased the shares and contracts of the Standard Anti-Fouling Composition and Paints Company.

[36] See *The Motor Industry of Great Britain*, 1953, Society of Motor Manufacturers and Traders. The annual consumption of paint by the motor-car industry about 1937 was over 2½ million gallons.

importance to the paint industry. After 1934, the number of locomotives constructed in Britain went up considerably; the number of carriages built also grew, and there may have been more painting for renewal purposes. After 1936, moreover, there was a fair amount of new construction, e.g. the Central Line in London. The railways produce some of their own paint, but probably only a relatively small proportion of their total requirements.

Not all firms are equally capable of transferring their attention from one type of paint to another, since not all of them have the technical personnel, the sales experience, nor the appropriate capacity for varying outputs. The development of demand for bulk quantities of paint in the motor-car industry was mainly relevant to a few firms who had plant and equipment large enough to cope with big individual orders. With the development of equipment capable of something nearer mass-production than the older techniques, this feature is if anything more marked. Moreover, there is an important element of goodwill to be considered; motor-car manufacturers need to be assured that the paint firm which tenders for their custom is able to meet specifications and delivery dates.

Factors such as these favour large firms rather than small but the smaller and medium firms have been protected by two considerations. The first of these is the unwillingness of many buyers, particularly those with a flow-production, to place the whole of their demand for paint with a single supplier. This is relevant, indeed, to the conditions ruling the relations among the big firms since it is improbable that manufacturers of motor cars, for example, would restrict themselves to any one paint manufacturer at any time. The second consideration is that even during years of low general business activity, the buoyant market for contract decorating paints meant that there were many orders which smaller firms could handle. Against this must be set the pressure on profit margins from speculative builders and of bad debts through the failure of some of these. The importance attached by the National Paint Federation to its Status and Credit Bureau is a reflection of this problem. The Bureau advises on the credit-standing of buyers.

(*b*) *Price elasticity of demand*

The behaviour of firms, given the conditions governing aggregate demand for paint in the country and in export markets, is linked with the relationship between the elasticity of demand for the paint firm's product and the supply elasticities of raw materials.

While it is probably true that demand for paint is inelastic for

the product of the industry as a whole, it will always be more elastic for individual firms. The fundamental point here is how firms interpret the position and how they behave. Of late years, the exceptional conditions of demand and the control of raw materials prices have reduced the fluctuations in final paint prices. In the different conditions of the 1930s, however, a considerable number of firms appear to have competed strenuously on price as well as on quality and to have done so throughout the period. They did so on both the downswing and the upswing of total economic activity in the country.

The limited data on annual variations in the output of paint, the figures of exports of finished products from this country, and of imports of raw materials for paint into it, suggest that there are fairly wide swings in demand despite the compensating elements to which reference has been made. This view is consistent with the references in the trade to excess capacity in firms in the industry.[37] Moreover, it has been an important feature of the industry that there has been competitive pressure from new entrants, many of them small firms with an employment below ten persons per establishment. The basic principles of manufacture are comparatively simple and the installation required for small-scale manufacture quite limited; this was particularly the case before the war when, moreover, wages would have been relatively low.

The industry is, accordingly, one in which there are a large number of firms and a continuing possibility of small entrants. Since the demand for paint is characterized by a great variety of small and heterogeneous orders, it is difficult to predict demand for any considerable period. Unless firms snap up such orders as they can as quickly as possible, they incur the risk of great fluctuations in the use of their production capacity. The extent and nature of competition differ in various parts of the trade, e.g. it is not the same in marine paints as in small-order decorating paints. But over a broad field of production, past experience shows that the large number of firms, the effects of new entry, the natural limitations to the horizon of the individual business unit intent on ensuring its own security, led firms to behave as if demand for their products were elastic. The fact that objective conditions of demand sometimes corresponded only very approximately with the initial subjective estimations helps

[37] See, for example, N. A. Bennett in his Chairman's Address to the London Section of the Oil and Colour Chemists' Association, September 17th, 1943. He said that before the war few, if any, firms worked to capacity; he estimated the ratio of output to capacity at about 50 per cent and attributed much of the blame to over-diversification of output in firms. While an estimate of this kind must be hedged with many reserves, there seems no doubt that for a number of reasons there was a fairly wide margin in many firms between maximum and minimum utilization of plant and equipment capacity.

to explain the growth of attempts to obtain wider price agreement in the industry.[38]

It is not suggested that the competition within the industry approximates closely to the ideal model of perfect competition. The imperfect character of markets for paint itself does much to explain the survival of the smaller unit; but all these things are matters of degree and for much of the industry, the price competition was extremely significant. Furthermore, although the many firms differentiate their products, the borderline between many of these is ephemeral. Thus, both new entrants and existing firms are able, subject to limitations such as transport costs and goodwill, to poach on one another's preserves. Only some part of output will be on continuing contractual orders, which are, in any case, likely to be subject to price competition. Because of the imperfection of markets, and, possibly, the influence of transport costs, many firms tend to market the bulk of their output regionally. This gives rise to a certain amount of regional specialization which is overcome by the larger firms through the establishment of branches or the acquisition of other plants.

In sum, when the general level of activity is declining and firms are anxious to take advantage of those lines of output which are holding up well, they attempt to ensure, in the face of falling demand, that their own capacity will be employed. When the general level is rising, they continue to cut, or at least to cut relatively by not raising price, so as to use surplus capacity, or where they do not have much of it, to meet the competition of new entrants.[39]

These considerations have a major bearing on the size of firm in the industry; before taking this point further, however, there is an important aspect of the cost structure to be discussed.

(*c*) *Supply price of raw materials*

The prices of raw materials for the paint industry tend to fluctuate violently in a free market; for some years, there has been no such free market, but it is now being restored. The following table shows price fluctuations for an eleven-year period before the war.

According to the 1948 Census of Production, vegetable oils accounted for more than a quarter of the total cost of purchased fuel and materials; the largest single item among oils was boiled linseed oil. Hence, price fluctuations of the magnitude shown in the above table have a great impact on the structure of costs as a whole.

[38] See post, pp. 164-7.

[39] For example, an article in *Shelf Appeal*, June 1939, comments unfavourably on price-cutting by new entrants. In a discussion of this article in the *Oil and Colour Trades Journal*, it is indicated that this was far from being the only source of price-cutting in the industry.

TABLE III*

PRICES OF LINSEED OIL AND TUNG OIL, 1928-38

Year	*Linseed Oil, delivered, London, Naked Price per cwt.* s. d.	*Tung Oil, New York and Atlantic Sea-coast, in drums or barrels Price per lb. U.S. cents*
1928	28 11½	15.2
1929	33 6	14.6
1930	32 6	9.6
1931	16 3½	7.4
1932	15 4	6.3
1933	18 3	6.8
1934	19 7½	8.9
1935	22 5	17.0
1936	25 0½	16.1
1937	28 7	15.5
1938	23 9½	13.1†

* Information from the Commonwealth Economic Committee.
† Last seven months of the year.

In periods of falling demand for the finished product, output is accompanied by a lowered schedule of prime costs because of reduced prices of raw materials. Some paint manufacturers argue that these considerations apply with quite different force to firms of different sizes. They say that firms which are so small that they do not manufacture their own media, e.g. varnish, but purchase them in small quantities and buy short, get the advantages of price falls without the burden of losses of working capital.[40] It is also argued, in respect of the long-period in which fixed costs become relevant, that demand may fall far enough to leave total unit cost above the initial level and that small firms are protected by the fact that they do not carry so much top-heavy capacity as the large firms nor so great a burden of administrative overhead. Whether, in fact, demand fell so far for many firms can hardly be established. The rising figures for net profits and good dividends shown by numbers of firms[41] throughout the 1930s, together with favourable comment in Company reports, suggest that they, at any rate, did not experience such a decline. For these figures appear even in years in which prices were probably falling.

(d) Price competition and price agreement

In given circumstances, firms of different size have to adapt themselves in different ways; there is no unique pattern of behaviour

[40] The importance of this rests on the amount and time for which varnish has to be stored (*a*) to meet current demand for paint, (*b*) to settle and mature. On the second point, the use of synthetic media in the manufacture of varnish reduces the time, but in total the consideration remains important.

[41] Statistics are available mostly for some of the larger firms.

of all firms in one set of conditions. Thus, for example, the large paint business gains by having resources of working capital and by making its own media; the small firm may adapt to this situation by buying-in its media. In the face of alternating conditions of demand, however, attempts were made to act as an 'industry'. In the late 1920s, and subsequently, for example, there came the attempt to contain price competition by agreement on classifying merchants entitled to discounts and on a concerted policy on discount terms (which can be used as a means of effective price-variation). A few firms decided to list those merchants to whom they gave terms and exchange information on any new inquiries. Subsequently, there was collaboration with the old National Federation of Builders' Merchants, and the 'Green Book', which was designed to standardize policy in respect of discounts, came into being.[42] It has been brought up to date from time to time. Representatives of the Federation, of the British Society of Paint Manufacturers, the Paint Manufacturers and Allied Trade Association,[43] the National Association of Wholesale Paint Merchants, and the Paint Section of the Building Industry Distributors, have worked together on this. The Green Book is linked up with the desire to obtain some standardization of merchanting terms, and to protect distributors against such competitors as builders or decorators who are also running merchanting businesses, i.e. where the firms are not primarily paint merchants, unless they are thought not to be in competition with, or detrimental to, established decorators or painters.

Throughout the 1930s there were a growing number of references to, 'cut-throat competition', 'price debasement' and 'price protection'. It was argued by some manufacturers that undue competition would restrict the development of research in the industry, inhibit the proper equipping of plants with machinery, and would hamper the possibilities of continuity of production.[44] In 1937 and 1938, firms accounting for 90 per cent of the output of the industry agreed to raise prices and this unwritten agreement is said to have been kept. It was reported as the first time that the paint

[42] S. E. George, *Paint Federation Journal*, July 1948, September 1948 and January 1949 (three short articles on the Green Book). See also, National Paint Federation (after consultation with other organizations representing paint manufacturers), *A Code of Commercial Practice*, 1947 (now under revision), for further attempts to codify business behaviour.

[43] Since December 1953 in 'cold storage'.

[44] See, for example, speech by Mr. Hamilton, Convener of the Paint and Oil Section of the Glasgow Chamber of Commerce. See also speech by Mr. Adamson at the Annual Dinner of the National Paint Federation in 1937; paint manufacturers 'must have a price association running alongside the Federation and in that way become "top liners" like those who have price-fixing associations'. *Oil and Colour Trades Journal*, December 3rd, 1937.

trade had taken concerted action in respect of prices. In January 1936, the Paint Materials Trade Association was established to deal with price questions. It has concerned itself with the attempt to establish schedules of members adhering to set prices for specific products, and to standardize costing procedures. The National Paint Federation (with others) has sought to establish a *Code of Commercial Practice*. In this, practices such as awarding prizes in money and kind in retail sale of paint are condemned, and an attempt made to secure uniform discount policies in the industry. Considerable weight is attached in the industry to problems of costing, particularly since it is argued that many firms are not fully aware of their costs.

It is beyond the scope of this paper to examine in detail the composition of trade associations in the paint industry. It is worth noting, however, that there are several organizations, reflecting the diversity of interests which firms feel. The membership of the National Paint Federation probably covers about two-thirds of the productive capacity of the industry, all sizes of firms being represented. The Paint Manufacturers and Allied Trades Association was formed in 1943 of many of the smallest firms (under ten persons) for a successful campaign against war-time concentration. Some years ago, many of the big firms formed the British Society of Paint Manufacturers; it has about forty members. The Paint Materials Trade Association has members from all groups but only covers perhaps one-quarter of the firms in the industry. Many of the important firms, however, belong to it and for the small number of products for which schedules have been drawn up, the proportion of output covered appears to be high.

Such agreements are apart from any other arrangements which firms themselves might want to make. But, aside from boom periods in which capacity might be fully employed, there is a considerable weight of (at least) apparent expediency against general price agreements. The attempt to secure a general code of behaviour as to discounts, etc., appears to work with varying success. Firms may be unwilling to bind themselves to adhere to such a code because they fear that other firms will not follow suit; they may think, for example, that special rebates may be given or that strict adherence to the code may be forfeited in the give-and-take when the traveller obtains an order. In any event, the arguments advanced earlier about the importance of employing capacity and about new entrants are relevant here.

Where the number of firms is fewer, as in the case of supply requiring large plant, there may be more possibility of general

agreement and the trends in technique have a great bearing in this sphere. Even here, however, there is room for price-cutting in order to capture orders. Since goodwill is often important, rivals can only break in by cutting price, for it is not sufficient merely to quote the same price as another firm. Such competition is possible because of the powerful forces of technical change and the extent to which it is possible to make paints similar to those of a rival. Although, perhaps, the bigger firms are pulling away from the competition of many of the smaller units, there is a good way to go; as long as firms are confronted by a variety of heterogeneous small orders, even the largest face competition from the smaller businesses.[46]

The foregoing analysis applies only with great reserves to the newly developing sphere of retail sales of paints in small containers for amateur decorators of own houses. As far as retail outlets are concerned, the products of any paint manufacturer normally sell at his predetermined price. This is so whether the paint reaches the shop directly from the manufacturer or through a wholesaler. Manufacturers appear to dislike the prospect of having their products selling at varying prices, partly for the reasons already discussed, partly because it is argued that lowering the price in particular outlets detracts from the prestige of the product and is generally disturbing. It is unlikely that a retailer who did cut prices would continue to receive supplies from an individual paint manufacturer. He would be able to buy elsewhere (i.e. it is not argued that there is collective boycott) and he might gain slightly better discount terms and service facilities.

In this sphere, the competitive struggle is taking place around the securing of outlets for distribution of the firm's products, in part by securing retail shops, in the main by persuading existing retailers to stock the paints. Here the importance of the branded good and the growth of a large market of consumers who are not well-informed about paint qualities suggest that this new trade may be confined mainly to a relatively few larger firms, subject to regional specialization. But this is as yet undecided and very uncertain.

IV

CONSEQUENCES OF THE VARYING INFLUENCES OF SUPPLY AND DEMAND: A SUMMING-UP

It has been argued in this paper that technological developments of the past thirty years or more have been consistent with production

[46] There is some analogy here with the fragmentation of markets for British textiles compared with, say, the situation in the United States.

on a larger scale both as to plant and to firm. On the supply side, in other words, there has been some pressure towards an increase in average size of plant and firm. While, however, it appears to be true that the average size of plant and firm has grown during the period, the small and medium-sized and even the very small firms (i.e. under ten persons per establishment) have held their ground remarkably well. This phenomenon has been attributed in the main to influences on the demand side which have helped smaller firms to operate within a framework of imperfect but often highly competitive markets. The various influences may be summed up in this way:

The demand for paint is characterized by great variety. A consumer may want only a few gallons or many thousands. Some decorating and industrial orders may be for small quantities in some special shade to fulfil some specific requirements such as exterior painting in very humid conditions. Others may be for painting large surfaces such as gas holders, or motor cars, or large numbers of machines, and may be required in substantial quantities in any single order. Orders for decorating paints may be large and for industrial paints small, though it is probably an accurate generalization to say that the production of industrial paints is associated with a more limited number of accounts involving the invoicing of larger quantities of paint per order than that of building and decorating paints.

The large firms tend to cover all kinds of paint and many of the medium-sized firms also cover a wide range of output. Firms outside the Census definition make small quantities of decorating paints. In the range of firms employing between ten and, say, one hundred persons, there is a tendency to concentrate on one of the broad groups, decorating or industrial. The former is perhaps more typical but is certainly not universal. Nor is it universally the case that such firms do not cover both groups of production.

Within this general context, the smaller firms are aided by their willingness to specialize in heterogeneity, i.e. in the supply of special shades in very small or relatively small quantities. The large firms will also do this, e.g. for an architect, if only on the principles of retaining goodwill or of 'setting a sprat to catch a mackerel'; much of the demand for the building and decorating paints comes through specifications by architects. The point is, merely, that small firms have been able to operate effectively in the field of the specialized small order; administrative simplicity, small overhead costs, and the fact that the basic principles of paint manufacture are uncomplicated, are of great importance in this context.

These influences are supplemented by local market attachments. They may lie in a degree of regional specialization which is possibly assisted by the influence of transport costs or by the powerful traditional attachments, through which paint firms, often old-established family businesses, continue to supply local consumer firms which are content to obtain their requirements in this way. Moreover, the fragmented character of much of the demand and the influence of monopsony impose a check on the factors making for bigness.

The development of the scientific character of the industry and the associated advantages conferred by large funds for research, tend to stimulate the growth of larger firms, in terms of aggregations of plants, irrespective of market limitations to using the optimum size of technical unit. This trend, while significant, exists within a framework in which such factors as specialization, the 'workshop' character of much of the research, and the possibility of buying-in synthetic resins of high quality, have enabled the smaller and medium-sized firms to maintain a significant place in the industry.[46]

How far the importance of large firms relative to others will grow, and also the relative positions of different sizes of firms outside the group of large firms, depend on a range of factors, particularly on questions of specialization and standardization.[47] On these depends also the question of whether growth in size will occur at similar rates in both the plant and the firm; this means whether there will be a shift towards large, departmentalized plants, or more towards financial aggregations of relatively small technical units.

The developments which have been discussed throughout this paper do not point unequivocally in any one direction. The path along which firms will proceed and the industrial structure which will emerge, depend on a balance of forces. In sum, the main elements appear to be the following:

On the supply side, the introduction of the ball-mill shifts the

[46] It is possible that Government allocation of raw materials during the war delayed the relative movement towards bigness by keeping smaller firms in being which might otherwise have disappeared.

[47] The interest which manufacturers show, on the one hand, in standardization, e.g. of colour ranges, and on the other in colourizer schemes, e.g. the Robbialac scheme brought out by Jenson & Nicholson Ltd., which might be termed a 'mass-selling' technique, are some indications, among others, of alternative ways of approaching what is much the same problem. In the Robbialac scheme 999 shades of paint may be bought in the form of paste in tubes, to be mixed as desired with the liquid (which is white or grey).

The various schemes bear on such questions as structure of markets, use of capacity, and requirements in storage space and working capital, which have been considered above; the outcome of the different developments is not yet decided.

See also the reports of the Anglo-American Council on Productivity on *Simplification and Standardization in Industry* where the greater standardization of the American paint industry is discussed; this must be considered in the context of market conditions which may be rather different.

cost conditions in favour of larger outputs and this is true of other improvements in technique in the industry. Unless the flow of large homogeneous orders justifies the use of larger ball-mills in larger numbers, however, this technical development is not decisive for size of plant or firm since its use becomes economic at relatively low outputs and is inexpensive in terms of initial capital outlay. On the other hand, taken together with the changes in chemical formulation of finished products and of inputs the weight of technical changes seems to be cast on the side of greater size of plant and firm.

It is the significance of the small, heterogeneous order for paints, which (together with the ability of firms to adapt to problems of change in the technical conditions of supply) has been of prime importance in helping the smaller and medium-sized units to survive. Fulfilment of this type of order does not require a large plant or even a large firm. Here too, however, there are financial and other advantages in having large firms (if not plants); moreover, the difficulties attending the small order may be overcome.

It is hard to make firm judgments about developments, the outcome of which depends on the interaction of so many variables.

It seems, at any rate, that the characteristics of a scientific industry will become more marked. The development of synthetic resins has established a kinship between the plastics and paint industries; the tenor of scientific development has been to bring the paint industry into closer relationship with the chemicals industry in general.

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Erratum

The following should be added to the Bibliography of Sir Henry Clay's writings:

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INDUSTRIAL PRODUCTIVITY: THE LESSONS OF FAWLEY[1]

by E. M. Hugh-Jones

The construction of the Esso Refinery at Fawley is one of the outstanding, if not, in fact, the biggest constructional job undertaken in this country since the war. It covered an area of 450 acres and its cost has been given as £37½ million. A considerable labour force was employed, rising to peaks of 4700 in November 1950 and 5100 in April 1951. Labour turnover is said to have been fairly low despite the difficulties of accommodation and of provision of amenities on the site; Southampton was 17 miles away. There were no major stoppages due to labour disputes. The job was started in July 1949 and by November 1951 was practically complete except for paintwork. Most major units began working in July 1951 instead of January 1952 as originally intended.[2]

This achievement has been hailed as a manifest success on at least two fronts — those of productive efficiency and of labour management. It is obvious that these two aspects are closely linked with one another. Fawley was at least original in that the management was American and the labour was British. It may be regarded as a large-scale experiment in the introduction of American production techniques into a British industry.

Such techniques have been the subject of many inquiries by the Anglo-American Productivity Council and their reports must provide the background for any discussion of the Fawley achievement. One in particular is relevant here, that on *Industrial Engineering*, because, although it was published in September 1954 it does set out

[1] This article is based on some remarks presented to a class in Industrial Organization conducted by Professor Jewkes, Mr. T. Wilson and myself. I am indebted to Professor Jewkes and others who took part in the discussion for many of the points raised.

[2] *The Construction of the Esso Refinery, Fawley*, is the title of a Report by A. P. Gray and Mark Abrams, published in March 1954, as British Institute of Management, Occasional Papers No. 6 (referred to hereafter as the Gray/Abrams Report). v. also an article by Mark Abrams in the *Spectator* for November 16th, 1954. All data given in this article are from these two sources. v. also 'Productivity' by T. F. Daveney, *The Bedside Guardian* (1954), p. 70.

In terms of mere quantities Fawley may be compared with the Appleby-Frodingham 'Seraphim' project, which took a year to plan, 3 years to full operation (major units in 2½ years), employed a maximum labour force of 1675 and cost £14 million out of the company's post-war capital expenditure of £26 million. The Calder Hall nuclear power station will cost £15-20 million and have an estimated working life of 10-20 years. The overall write-off period for Fawley averages 20 years, ranging from 50 for buildings to 15 for 'cat cracker'. It would be wrong to base any qualitative comparisons on these figures which are merely of gross quantities and take no account of technical differences between projects, site factors and many other considerations which would enter into a detailed comparison.

succinctly the arguments in favour of some of the technical procedures that were adopted. It does, indeed, cover a much wider field,[2] but in this article I propose to select only those recommendations which seem to provide a background to Fawley and to raise certain questions of general interest.

First, however, what is meant by 'industrial engineering'? If one may judge by the recommendations and the definition proposed by the productivity group, it can comprise anything and everything which relates to production. The group itself would seem to have been not very clear on what the term really means, and its recommendation that a standard definition should be worked out probably is one of the less important of its recommendations. But, in order to define a certain universe of discourse, it may be helpful to quote some of the simpler statements given in the report's appendix. An industrial engineer is quoted as saying that industrial engineering 'interests itself and works with the most economical and constructive use of men, materials and time'. A Trade Unionist states 'The function of the industrial engineer is to go into a plant to change methods and procedures in order to reduce costs.' The objective of cost reduction is also referred to in a definition put forward by a leading industrialist. Indeed, this last point, cost reduction, appears to be the essential object of the exercise and it is to be noted, I think, that the reduction is in real, and not just in monetary, costs. Thus, the group's recommendations in the field of taxation and depreciation are not really in the present picture.

The group discerns in the United States three driving forces which operate to achieve this given end. There is, firstly, what they term the 'cheque book' influence of larger firms on their sub-contractors. Larger firms are said to set standards of quality, delivery and price to which small firms supplying components under sub-contract are required to conform. This makes for efficient industrial engineering in the sense implied. Secondly, they refer to and, indeed, stress the competitive atmosphere in the United States which is reinforced by legislation. The American firm is like the Red Queen, forced to keep running if it is even to remain in the same place in the economic market, and an increase of productivity of from 3 per cent to 3½ per cent a year is necessary to achieve this. The contrast with British

[2] The report itself is a very miscellaneous document; it puts forth a wide variety of recommendations of very different degrees of significance, and the link between them is sometimes neither very obvious nor very precise. It contains a number of interesting statistics (e.g., on the ratio of profits to sales and of sales to inventories in various industries), some rather summary judgments (e.g., on the influence of American market conditions and the proper scale of research) and explodes some general misconceptions (e.g., the limited range of American products and the lack of restrictive practices in American Trade Unions).

conditions is heightened in the mind of the group by the consideration that industrial structure in the United States is not markedly different from that in the United Kingdom. Most firms are small or medium in size, and of the quarter million manufacturing firms, 237,000 employ less than 250 workers, although 80 per cent of automobile output is done by three companies. Finally, they refer to the existence in American management of an apparently inborn drive towards new methods for reducing costs. A good American executive is one who is divinely discontented with present methods of doing anything and believes that anything he has done, he can do better. It is a state of mind which regards nothing as impossible, but merely taking a little longer than what is only difficult.

Operationally, American industrial engineering is seen as characterized by three main and distinct procedures. Firstly, there is very detailed preparatory planning, which proceeds on the basis of frequent conferences between all those concerned, the 'huddle' so characteristic of American football. The object of this is to ensure that all persons have continuous information and the fullest knowledge in advance of what it is proposed to do, and to provide a check on projected activities right up to the moment that these start in order to secure the greatest possible ease of operation. The group clearly regard this as the major characteristic of American industrial engineering practice, and its concrete result is the production of a carefully worked out and detailed timetable and a plentiful supply of working drawings and instructions, themselves in considerable detail. Secondly, there is a continuous scrutiny of the actual working out of these timetables and a continuing analysis of costs. This implies a much more substantial use of cost accountants at all levels than is customary in this country, and costing as a tool of management is judged in the United States largely by its effectiveness in controlling operations and in contributing to the formation of policy. Indeed, the speed with which cost calculations can be presented is often rated more highly than their specific accuracy.[4]

The result of these two procedures is to develop a very tight timetable of construction and deliveries which requires continual insistence that the timetable should be adhered to, both within the factory or construction project and by outside contractors who are responsible for supplying materials whether raw or fabricated. This is justified, among other grounds, for the reason that it produces a

[4] David Langdon draws an entertaining picture of a messenger running to the plant with a sheet bearing the legend $\frac{3}{4}$

The group's view of the difference between the American and British attitude to cost accountants is interesting and doubtless controversial, but not relevant here.

marked economy in the holding of stocks. 'Carry as little as you can without shutting the plant' is given as the motto of the American factory manager.

The group does not think that the American worker works harder or that their machinery is better tooled or superior to that used in this country, although they have more of it. 'Their superior productivity is due to more accurate planning by management and more constant analysis of methods which enable them to work more effectively.'

In the sphere of employer-worker relations, the group notices, but does not specifically describe, 'significant differences' in the relation between management and workers in America and Great Britain. They suggest that these may be due to the absence in America of historical class barriers and to the greater acceptance of a general community of interest.

On a more concrete level, they consider the possible relationship between wage systems and incentives to produce, but the argument is inevitably inconclusive because of the multiplicity of wage systems and the uncertainty of the categories to be employed. But, from the point of view of production costs, it would emerge that they envisage a broad choice at the extremes, between pure time rates, plus time study, plus a good deal of supervision on the one hand, and pure piece rates, plus quality checks, plus rather less supervision on the other. The latter method may give an equal output with rather less manpower employed.

On the position of trade unions, they note that restrictive practices are not unknown in America, but these are not detailed because 'our purpose is to point to American practices that may be transferred to Britain with advantage'. Indeed, they remark upon the aggressiveness of the policy of American trade unions in demanding for example, that their members should be paid during lay-offs and the incorporation in annual wage contracts of an 'improvement factor' whereby basic wage rates shall rise year by year. These two features of American wage bargaining are held to exert a powerful pressure on firms to improve their productivity. They note also that union agreements are negotiated in America on a plant rather than on a national basis, and often by one union for all the workers in a plant irrespective of their occupation. They hold that this has various positive advantages. It stimulates the interest of workers in the activities of their union; it simplifies the wage structure on the basis of which negotiations are to take place; it opens the possibility of a variation in wage rates between plants of different levels of efficiency.

Let us turn now to Fawley and consider how far the success of that project may be attributed to any of the above procedures. One should note that the project itself enjoyed certain unusual advantages. There was only one customer and only one main contractor with very little sub-contracting. It was thus possible not merely to expect, but also to achieve a very high level of co-operation between the customer and the contractor. Secondly, because of its national importance it received a priority in the supply of important basic materials, and because of the American interest in it, there was no difficulty about obtaining either dollars or supplies of American materials and equipment.

Nevertheless, the actual progress of the job as described in the Gray/Abrams Report does suggest that its success was due not to unusual advantages but to following very closely the procedures described above. There was very comprehensive and early planning. This began in 1947 and some of the materials were ordered in 1948, at least a year before the beginning of construction. The plans themselves appear to have been very detailed and to have shown precise dates for the completion of various stages of the project. The number of drawings and blue-prints appears to have been very high; in one instance, it is said that there were four times as many as would have been usual on an English construction project, and this is said to have carried with it the advantage that there could be no doubt about just what it was that was to be constructed.

There was a very strong supervisory team of Americans of great practical experience and technical ability, and many of them, indeed, with high academic qualifications as well. Their function is given as being to keep the work going by ensuring an adequate flow of materials and the use of the best technical methods. Their function was clearly very important and one that is by no means overlooked in 'all-British' schemes, where the activities of 'progress chasers' have proved equally essential to success. But it may also be surmised that not the least important aspect of their functions was to see that work actually proceeded during the whole of the agreed working hours and was not unduly interrupted even by such apparently harmless functions as a tea-break. This was ensured by their being on the job for the same hours as the actual workers or even longer, which seems to have been interpreted by the workers themselves more as a sign of social equality than in its more regulatory aspect. The key position occupied at Fawley by the American supervisors does prompt the question whether the American habit of 'hustle' can be more readily accepted by British workers and management if urged on them by Americans rather than by their own kith and kin.

But this speculation would lead on to a discussion of relative national psychologies, from which I would refrain.

There was a very keen insistence on strict adherence to delivery dates which was not always agreeable to British suppliers. That this strictness was possible was partly due to the availability of dollars, the easy supply position in the United States and the general enthusiasm which the magnitude of the job appears to have generated. But it is also claimed that it was due to foresight and accurate preliminary estimates of the amounts required. For example, an estimate for the requirements of welding rod two years in advance is said to have been only $\frac{1}{4}$ per cent out. Clearly, too, a good deal of energy was expended in chasing dilatory suppliers.

Relations between labour and management exhibited some features unusual in this country. Although members of thirteen different unions were occupied on the job, all labour was engaged under one contract with the Confederation of Shipbuilding and Engineering Unions. This contract, moreover, was entirely local, not merely in respect of its negotiation, but also in respect of its subsequent implementation. Neither side appears at any stage to have referred questions to the national level and it was thus possible for disputes arising on the site to be settled with the utmost speed.

There was a unified and very simple wage structure. Irrespective of their trades, men were grouped into three classes — skilled, semi-skilled and unskilled. No piece rates or bonuses were paid and only two special allowances (for height and for working in a confined space). The high level of mechanization had the result that only a very small proportion of the men was paid the general labourers' rates, but rates in general were said not to have been unprecedentedly high. This situation has obvious advantages as compared with the very large number of job definitions commonly found in engineering and constructional work. It made it possible for men to be moved around without loss of pay and provided clear-cut lines of promotion.

Another specific advantage was that it kept shop stewards out of those disputes on wage rates which can be so fruitful a source of trouble. In fact, the labour contract relegated the shop stewards very much to the background and this is one of its notable features. Management agreed that it should be a 100 per cent union job and provided facilities for a full-time Convenor of Shop Stewards, a Shop Stewards Committee and a Site Executive Committee. But the functions of shop stewards were generally restricted to checking union membership and to the settling on the spot of questions concerning the physical conditions of work. Questions covered by the agreement with the C.S.E.U. (e.g., wage claims, dismissals and the

allocation of labour) were definitely outside their scope, as also were disputes that could not be quickly settled on the spot.

Finally, the Gray/Abrams Report throughout highlights the excellence of the personal relations which obtained on the site. The Project Manager was always around, spending more time on the site than in his office and was obviously very fully informed of all that was going on. He was, moreover, completely accessible; his office door was always open and this was appreciated even by people who felt no need to go and call on him. Another notable and even startling feature is the comments made on the friendly relation between supervisors and workers, a situation partly due to the American character of the supervisors, but partly a conscious policy. They worked the same hours as the men and their attitude appears to have been very different from that attributed by workers to the average British foreman. For example, 'They muck in. They don't ask you to do anything they wouldn't do themselves. They will take the tools out of your hands and do a job for themselves. An English foreman wouldn't do that. English foremen are more like members of the white collar class.' 'The Americans are always ready to help. If we are lifting some pipes and ask McGuire [one of the supervisors] to give a hand, he does. An English foreman wouldn't do that.'

The conclusion of the Gray/Abrams report may be given in its penultimate paragraph.

> There is no single and simple explanation of the unexpectedly high productivity of the men who constructed the Fawley refinery and completed their task almost six months ahead of time. In this achievement they were undoubtedly helped by various external and fortuitous circumstances such as easy supply conditions in the materials markets. It is equally certain that part of the project's success was due to the employment of techniques of organization and management which are comparatively unusual in this country.

The morals, if any, to be drawn from these two documents would seem to arise through a series of questions. Let us first go back to the *Industrial Engineering* report and consider three of their recommendations, quoting from the summary on page 84 and following:

> Detailed preparatory planning of production should be undertaken before operational decisions are taken. . . . (No. 9)
> A searching inquiry into practicable alternative courses of

action and their comparative costs should be made before business decisions are taken. (No. 11)
Production should be closely controlled to conform to a time-table planned in advance. (No. 21)

One's first reaction to at least the last two of these is that they are quite blindingly obvious. At least to one not brought up in the atmosphere of industry, it would seem only natural to consider alternative courses of action before deciding on a given programme and to follow up that programme to ensure that it develops in the way intended. But the fact that the group evidently thought it worth while to make, and even to stress, these recommendations suggests that they are not normally practised in British industry. But what circumstances are there in British industry which enable them to avoid the obvious? If one goes back to the stimuli which the group found in the United States, one might be tempted to suggest that British industry either lacks the goad of competition or the urge of managerial drive.

There is a possible alternative, namely that perhaps even in the United States things do not quite work out as the group supposes. If we now turn to the Gray/Abrams Report to see what is regarded as the main achievement at Fawley, we find that the report is quite specific.

> The fact that in actual construction, the Fawley refinery kept very closely to both manpower estimates and the time schedule is the essence of the Fawley achievement. It is the reason why this report is being written. Achieving this end was due partly to the realism of the original estimates and schedules, and the amount of information on which they were based. But it was also due to a determination on the part of all concerned to see that they were kept. The most important aspect of control of the job in the field was regarded as control of achievement, not of cost.

What this seems to amount to is a claim that the achievement of Fawley is that it finished on time, or rather it adhered closely to the estimates of work to be done in relation to man-hours expended which, in the end, achieved an almost complete agreement. This is claimed to be due to careful pre-planning.

But how far can it be really claimed that this pre-planning was 'realistic'? After July 1950, construction was speeded up by some 30 per cent in order to complete the whole project in four half-

years instead of five; it does not appear that the project was ahead of schedule at that date. Now no one would suggest that the project as a whole was a failure because it was completed sooner than originally planned. But it may be argued that an original plan that proves to be achievable in four-fifths of the estimated time is just as unrealistic as one that in the end requires five-fourths.

One factor which appears to have contributed to the ultimate speeding up of the process of construction was the improvement in the efficiency of the British workers as the work progressed. It is stated that it had improved by 30 per cent by the end of the project and was within 15 per cent of American standards. It is not clear whether any allowance was made for this in the master plan; the implication is that the latter was based throughout on the assumption that 154 British workers were equivalent to 100 Americans.

Taking the matter more generally, if the plan was so loose as to be no more than a general statement of objectives, then speeding up is clearly not too difficult. It allows scope for improvising and for making advantageous alterations while work is in progress. (Incidentally, one might remark here that while the provision of many and detailed drawings is said to have been a considerable advantage it is possible that too detailed drafting might itself have a restrictive effect by making it more difficult rather than less to make such alterations.) But in such circumstances the plan itself seems to lose much of the virtue attributed to it as a check on progress; one is tempted to ask how valuable it was in the first place. On the other hand, if the original plan was as tight as is suggested by the description of detailed planning of every stage in the job, with exact delivery dates strictly insisted upon, the speeding up process must have involved a completely new timetable for the second, and originally longer, portion of the project. It does not seem realistic to suggest that all supplies were on the site by July 1950, so that all that was involved was a speeding up of the process of assembly. Delivery dates must, in many cases, have been advanced, sometimes possibly by as much as six months. What effect would this have on suppliers if they, too, were working to detailed timetables of their own, in which supplies to other projects had also to be fitted? (Indeed, if original plans are, like basic piece rates, something that is always to be improved on, so that demands for delivery are always to be intensified, the result might well be chaos.) One is, in fact, tempted to wonder whether the real merit of the Fawley achievement ought not rather to be attributed to the degree of flexibility and capacity for improvisation possessed by the suppliers of materials.

One might also note from the last sentence of the quotation above that the most important aspect was regarded as control of achievement, not of cost. If one is right in supposing that the essence of industrial engineering is the control and economizing of cost through pre-planning, the Fawley experiment would appear to have been conducted on rather different lines. Admittedly here one's information is incomplete, for the Gray/Abrams report was not concerned with this aspect. We are indeed only given the total figures and there is nothing to indicate how the final cost of the project compared with the original estimate. Nor is there any indication given of how the cost would have compared had only one year been given to planning and three years to execution instead of an equal spread of the total time between planning and execution. But since the original plan must have been subsequently altered, much of the early planning must, from the cost point of view, have been a pure loss. Both the employment peaks came within the speed up period (4700 in November 1950 and 5100 in April 1951), and it must be presumed that these were not part of the original plan. Moreover, if the last half of the work was done in one-third less time with the same total man-hours, it looks as if the wage costs must have risen and thus have increased the final cost as compared with the original estimate.

In the operation of the plan, the high proportion of supervisors has already been mentioned and some further analysis of the relative costs of supervision as compared with the value of their functions would be extremely useful. The report quotes a statement by some firms that supervision costs were unusually high. The function of supervisors in ensuring a flow of material is very obviously important, but the Gray/Abrams report seems to underestimate that other part of their function, namely to ensure that a fair day's work was given for a fair day's pay. ('All trucks should be rolling at 8.') If, as seems to be the case, the workers were seldom conscious of being driven, the solution of this problem must lie rather in the field of personal relations than of material incentives or devices of organization.

This point comes out more strikingly in the story of the handling of labour relations at Fawley. The structure of labour relations obviously helped here; for example, that they were based on a contract that was observed rather than on an agreement that was always being whittled down. At Fawley, unlike British European Airways, there appears to have been no need to get workers to sign an agreement to observe a previous agreement. The position of shop stewards and of union officials seems to have been rather that obtaining in the United States than in British industry, and although this appears not to have been relished by the shop stewards, it does

appear to have been appreciated by the trade unions. In the prevalence in general of the American view of labour relations, one meets at almost every turn the effect of the personality of Bob Cole, the Project Manager.

Apart from the various particular questions suggested above, one general question does seem to be raised by the Fawley experiment, that is to say, whether perhaps, even in American industry, detailed planning may be only a façade; whether, in fact, their proceedings are not rather more like the description given by General Hugh S. Johnson of his work in the National Recovery Administration, 'We hammered away, sometimes hitting the nail, sometimes the thumb'. Is it perhaps that the real basis of their industrial achievement is not to be found in any particular expertize of planning, but something in the make-up either of American society or of the American individual? I would not wish to deny the importance of a façade; if the erection of a railway terminal could be made more acceptable by pretending that it is a Scotch baronial castle, by all means let the pretence be made. But to erect the castle and omit the railway would be no greater a mistake than to adopt an American façade of planning without creating at the same time and if it can be done, the atmosphere of competitive conditions and the facts of personality, of managerial drive and discontent that accompany it. Otherwise, one may find oneself in the situation described to me by a friend whose hobby is canoeing on the French rivers. He once remarked to a Michelin bus official that the great number of forms that he now had to fill up to secure the transport of his canoe as compared with the simple pre-war purchase of a ticket threatened to cause him to miss the bus. 'Ah, Monsieur,' was the proud reply, 'mais, maintenant, nous sommes organizés.' His thought that this might be the epitaph of the twentieth century is perhaps not entirely unreasonable.

KEBLE COLLEGE, OXFORD

CHANGING PATTERNS OF PIT PERFORMANCE[1]

by W. H. SALES

'It takes all the running you can do to keep in the same place.'
Through the Looking Glass

I. INTRODUCTION

1. SIR HUBERT HOULDSWORTH, Chairman of the National Coal Board, in a paper[2] to the Manchester Statistical Society, said of the coal industry: 'In a sense there is no industry: there are only 900 pits.' The National Coal Board's nine hundred pits vary widely in size, age, history, and natural conditions. It is not the function of the Board's Headquarters to follow and control from week to week the detailed operation of these units. For short period analyses an examination of the aggregate results of groups of pits must suffice: but for the longer run the Board need a means of following and comparing the results of individual collieries. For this purpose a system of reporting known as the 'Colliery Profile' is being developed. At the Board's Headquarters Hollerith cards for each colliery are prepared annually containing 'dynamic' data on performance, manpower, costs, etc., and 'static' data such as depth, age and type of coal worked. These data are processed to provide a series of studies of the structure and dynamics of the industry. The experiment is still in its early stages and suitable analytical techniques are being developed as it proceeds. Some of the results of a recent exercise using the Colliery Profile are given in Sections II and III.

II. OUTPUT AND PRODUCTIVITY

2. The performances of 830 of the Board's collieries in 1951 and 1953 have been compared. The behaviour of these pits is illustrated in Diagram I (at p. 192). These 830 pits accounted for 97.5 per cent of the industry's deep-mined output in 1951 and 97.8 per cent in 1953. Their aggregate output rose from 206.7 million tons to 207.8 million[3] tons, i.e., by 1.1 million tons or just over 0.5 per cent. We first divide the pits into those where output increased and those

[1] The author wishes to acknowledge the help of Mr. E. F. Schumacher, the Board's Economic Adviser, and of his assistant, Mr. P. A. Daniell, who have been closely associated with the Colliery Profile since its inception. The assistance of Mr. W. B. Wakefield of the Central Statistics Branch is also gratefully acknowledged.

The material in this paper was first used in a talk to the Nottingham Mining Society on February 15th, 1955.

[2] *The Pits of Britain*, February 11th, 1953.

[3] Throughout this paper no account is taken of the effects on output of the Coronation holiday or of the second week's holiday with pay taken for the first time in 1953.

where output decreased, comparing 1953 with 1951. As Diagram II shows, there were 405 pits (accounting for 49 per cent of the 830 collieries under investigation) which increased their production by a total of 10.4 million tons. Conversely, there were 425 pits (accounting for 51 per cent of the collieries) the output of which declined between 1951 and 1953 by a total of 9.2 million tons. Thus the near stagnation in the national output total disguises very considerable changes in the behaviour of individual collieries. The turnover, if we may so call it, is as much as 10 million tons.

3. We can now go further and concentrate on those pits where the change in output was significant.[4] As Diagram III shows, of the 405 'expanding' collieries, 231 showed a significant increase in output, while 174 increased their outputs by less than 7½ per cent. The aggregate output of these 231 pits rose from 50.2 million tons to 58.5 million tons, i.e., by 8.3 million tons or 17 per cent in two years. On the other side, of the 425 'declining' collieries, 251 showed a significant decline, while 174 showed a decline of less than 7½ per cent. The aggregate output of these 251 'declining' collieries in 1951 was 53.4 million tons which declined to 46 million tons in 1953, i.e., by 7.4 million tons or 14 per cent. The fact that 231 collieries managed to increase their aggregate output by 17 per cent in two years found practically no reflection in the national total, because another group of collieries lost much the same amount of output during the same period. We are interested, however, not only in output but also in productivity.[5]

4. Between 1951 and 1953, the national productivity figure showed no net change. Although output per manshift overall was 1.21 tons in both years, productivity did change considerably at individual collieries. As Diagram IV shows, increases in output were, in the main, associated with improvements in productivity. At 296 (73 per cent) of the 405 pits where output rose, productivity increased. But there were 109 pits where higher output was obtained without an increase in productivity and there were 79 pits where increased productivity did not result in higher output. These anomalies will be discussed later in this paper.

5. It is interesting to consider those collieries where both output and productivity rose or fell significantly. Out of the 231 significantly 'expanding' collieries, 141 (i.e., 61 per cent) at the same time

[4] On the Colliery Profile output changes are recorded in 5 per cent steps. For the purpose of this paper a change of 7½ per cent or more has been taken as significant.

[5] Throughout this paper, productivity means labour productivity, i.e., output of coal per manshift worked. Output means saleable output, i.e., the tonnage of coal available, after cleaning and other processing, for disposal to customers or as miners' coal or for colliery consumption.

showed an improvement in productivity of 7½ per cent or more. On the other hand, out of the 251 collieries which showed a significant fall in output, 175 (i.e., 70 per cent) at the same time showed a fall in productivity of 7½ per cent or more. Those collieries which showed significant increases in both output and productivity we can call the 'Improving Group' and those with significant decreases in both output and productivity we can call the 'Deteriorating Group'. These two groups of collieries can be distinguished on Diagram I. Reference to this diagram shows how, after an initial division of the 830 collieries into those where output increased and those where output decreased, groups are successively eliminated until, by following the shaded blocks towards the right, we arrive at the 'Improving Group' and the 'Deteriorating Group'. These two groups will be the subject of some further examination.

6. The first matter of interest is that the 141 collieries of the 'Improving Group' are distributed over no fewer than 44 'Areas'.* Similarly, the 175 collieries of the 'Deteriorating Group' are distributed over 48 'Areas'. It is therefore fair to say that practically every one of the National Coal Board's 51 'Areas' can show one or several outstanding successes but, judged against the same limited criteria of output and productivity, must also admit one or several outstanding failures. In two years, the output of the 'Deteriorating Group' declined from 37.6 million tons to 32.3 million tons, i.e., by 5.3 million tons or 14 per cent, while that of the 'Improving Group' rose from 29 million to 34.4 million tons, i.e., by 5.4 million tons or 19 per cent. Again, the achievement of the latter was all but offset by the failure of the former.

OUTPUT AND MANPOWER OF THE 'IMPROVING' AND 'DETERIORATING' GROUPS OF COLLIERIES, 1951 AND 1953

		Output		*Manpower (end of year)*	
	No.	*1951*	*1953*	*1951*	*1953*
		Mill. Tons	*Mill. Tons*	*Thousand*	*Thousand*
'Improving Group'	141	29.0	34.4 (+5.4)	97.7	102.1 (+4.4)
'Deteriorating Group'	175	37.6	32.3 (−5.3)	124.1	123.1 (−1.0)

* For management purposes the coalfields are divided into 51 administrative units. Although only 48 of these are actually called Areas, in this paper the term 'Area' is applied not only to these but also to two groups in South Western Division and to the small South Eastern Division.

7. The table on p. 186 shows changes in output and manpower in the 'Improving Group' and in the 'Deteriorating Group' between 1951 and 1953.

The 'Improving Group' employed 97,700 men at the end of 1951, expanding to 100,700 men by the end of 1952 and 102,100 men by the beginning of 1954. The 'Deteriorating Group' of collieries, on the other hand, showed no consistent pattern of manpower development. At the end of 1951, it had 124,100 men; it increased to 127,000 men by the end of 1952, and fell back to 123,100 men by the beginning of 1954. In other words, these pits, although their output and productivity were falling rapidly, took part in the general expansion of manpower in 1952, only to lose all their additional manpower and even more during 1953.

8. Under the National Plan for the industry all the Board's pits are classified. The following table shows the planning classifications of the pits in the 'Improving' and 'Deteriorating' groups.

PERCENTAGE DISTRIBUTION OF PITS ACCORDING TO PLANNING CLASSIFICATIONS

	'Improving Group'	'Deteriorating Group'
Short life pits	19	24
No substantial change	45	40
Major reconstruction or new sinking	11	9
Minor reconstruction	16	16
Uncertain	9	11

Both groups contained a large number of short life pits. Few of the big reconstruction schemes had been completed by the end of 1953, but each group contained four collieries where a scheme had been completed. The 'Deteriorating Group' contained more collieries where a reconstruction scheme was in progress at the end of 1953 than did the 'Improving Group'. This is not surprising. Reconstruction is often necessary to maintain output and raise productivity at pits where results are deteriorating and the process of reconstruction can be a temporary cause of reduced output and productivity. On the other hand, the 'Improving Group' included many more collieries where reconstruction was planned but had not yet started at the end of 1953.

9. In Diagram V the frequency distributions of collieries according to their absolute levels of productivity are shown. Of the collieries in the 'Improving' and 'Deteriorating' groups taken together, 70 pits (about one-fifth of the total) had high productivity in 1951. Similarly, in 1953, 68 pits in the two groups together had high

productivity, but only 51 of the original pits remained. At the other extreme, in 1951, there were 76 collieries of very low productivity and 86 such collieries in 1953 but only 43 of the original ones remained. The other 43 had, as it were, come down into the low class from a higher productivity level. This is a matter of great interest in connection with the problem of the identification of so-called 'marginal pits'. At any one moment we find there are collieries with a very low productivity level. Their number is fairly stable in time but closer investigation shows that they are by no means always the same collieries. There is, on the contrary, a large 'circulation', involving, in this latter instance, fully 50 per cent of the collieries concerned.

10. As regards the degree of mechanization, both the 'Improving' and 'Deteriorating' groups present a representative sample. It is interesting, however, to note that the 'Improving Group' contained three of the seven most highly mechanized pits of the country, while the 'Deteriorating Group' contained none.

11. Nor is there anything in the size[7] distribution. When allowance is made for the short life pits — mainly in Scotland and Durham — where the decline in output appears to be due to exhaustion, the size distribution of the remainder is practically identical in both groups and also representative of that of all collieries in the country.

12. The extent of the deterioration experienced at some collieries and drifts[8] is remarkable[9] as this table shows:

Increase in Average Cost per Ton, 1951-53	*No. of Collieries within 'Deteriorating Group'*
50 per cent or more	35
of which: 60 per cent or more	17
90 per cent or more	5

Further details have been extracted about the five collieries where average costs increased by 90 per cent or more. One closed in 1953 and two others ceased to work two of their three seams in that year. The remaining two units were both small drifts. On the other hand, over a period when national average costs rose by some 20 per cent there were 36 collieries where costs fell. Of these, 28 were

[7] In terms of output only.

[8] A drift is a unit where the coal is approached by a sloping road instead of by a vertical shaft from the surface. Drifts are usually used to work shallow coal and tend to have a small annual output and a comparatively short life.

[9] Since collieries vary considerably in size, it is usually necessary to begin an investigation of pit performance by a comparison of percentage changes in results. But large percentage changes do not necessarily indicate the presence of conditions which are important for the whole industry. Thus three apparently striking cases where manpower increases of over 32½ per cent were associated with a decrease in output turned out to be three small drifts. At one of them, first used in 1951, manpower increased from 41 to 55 (+34 per cent) and output fell by 7,000 tons.

amongst the 141 collieries in the 'Improving Group'. One colliery reduced its average costs by over 30 per cent. Three drifts decreased their average costs by more than 20 per cent. Such a reduction might be expected at new drifts which were just coming into full operation. But although one of these three drifts was opened in 1950 and is expanding rapidly, the others date from 1925 and 1947.

13. So far, we have dealt only with collieries where a significant change in output was associated with a significant change in productivity, both changes being 'in the same direction'. It is worth noting that there are quite a few cases where both changes occurred, but in opposite directions. At 37 collieries output increased significantly while productivity declined (Diagram I); at 13 of these collieries — situated in 11 different 'Areas' — the fall in productivity was larger than 7½ per cent yet they were collieries whose outputs rose by more than 7½ per cent. Conversely, at 22 collieries output fell significantly although productivity rose; at 12 of these — all in different 'Areas' — the rise in productivity was more than 7½ per cent, yet their combined output fell by 17 per cent. Most of these collieries will have a short life. (Of the eight units in this category, one has already closed and one has now ceased winding from its own shaft.)

III. OUTPUT, PRODUCTIVITY AND COSTS

14. It is normally expected that changes in productivity, output and costs will be co-ordinated, so that an improvement in productivity is accompanied by an improvement in output and in average costs, and a deterioration in productivity, by a deterioration of output and average costs. If this were generally the case, the problem of 'evaluating' performance would perhaps be tolerably simple. To test how far 'co-ordination' exists it is first necessary to define 'improvement', 'deterioration' and 'stability'. In the following exercise, relating to 828 pits, output and productivity are taken as having improved or deteriorated when the change is greater than 2½ per cent. For average costs, since national average costs per ton increased between 1951 and 1953 by just over 20 per cent, an 'improvement' is defined as an actual decrease or an increase of less than 19½ per cent and 'deterioration' is restricted to values greater than 24½ per cent. Secondly, it is necessary to decide which indicator of performance shall be used for the initial break-down of pits. Paragraphs 15 and 16 are based on an initial breakdown in terms of productivity changes.

15. The collieries which exhibited complete 'co-ordination' are distinguished in the following table:

Break-down Factors	*Number and Percentage of Collieries with:*						
	'Improvement'		*'No Change'*		*'Deterioration'*		*Total*
Productivity	312	37.7%	135	16.3%	381	46.0%	828
Productivity and Output	241	29.1%	47	5.7%	290	35.0%	578
Productivity, Output and Costs	219	26.4%	12	1.4%	239	28.9%	470

In all, 470 collieries — 57 per cent of the total number — showed complete consistency of changes in productivity, output and costs. If we relax the conditions and include collieries where an 'improvement' or 'deterioration' in two factors was associated with 'no change' in the third, a further 150 collieries (18.1 per cent) are covered. At a further 68 (8.2 per cent) collieries 'no change' in two factors was associated with an 'improvement' or 'deterioration' in the third. Thus 218 collieries exhibited 'partial' consistency. There remain 140 collieries, 16.9 per cent of the total, where both 'improvements' and 'deteriorations' occurred. The composition of these various classes is shown in the following table where '+' represents an 'improvement', 'o' represents 'no change' and '—' represents a 'deterioration' in productivity or output or average costs.

ASSOCIATION OF CHANGES IN PRODUCTIVITY OUTPUT AND COSTS
1951 AND 1953
(NUMBER OF COLLIERIES)

Consistent		*Inconsistent*
Absolute	*Partial*	
+++ 219	++o 72	++— 45
	oo+ 34	
ooo 12		+o— 48
	oo— 34	
——— 239	——o 78	——+ 47
470	218	140

16. The difficult task of attempting to evaluate performance in the coal mining industry is particularly baffling in the case of these inconsistent collieries — one in six in the whole industry and scattered throughout the coalfields. Further details about them have been extracted but they have not yielded a sufficient explanation of the inconsistencies. The size[10] distribution of the inconsistent collieries broadly resembles that of all collieries in the industry, though a rather larger percentage (39 per cent) of the inconsistent collieries are very small compared with 30 per cent of all collieries. The inconsistent collieries do not include an undue proportion of units with high or low productivity, high cost or low cost units, unprofitable or profitable units. Indeed, their distribution fits the national distribution extremely closely. The inconsistent collieries do, of course, differ from the national picture in their manpower experience between 1951 and 1953. Some two-thirds of the collieries had big changes in manpower as this table shows:

CHANGES IN MANPOWER, 1951-53

Change in Manpower	*Inconsistent Collieries*		*Great Britain (828 collieries)*
	No.	*Per cent*	*Per cent*
Decrease 7½% or more	28	20	12
Little change (7·4% or less)	53	38	64
Increase 7½% or more	59	42	24
	140	100	100

17. An alternative approach to that in paragraph 15 is to make the initial break-down in terms of output changes. What changes in productivity and costs were associated with changes in output between 1951 and 1953? Output rose by more than 2½ per cent at 343 collieries. At 241 (70 per cent) of them productivity also rose and at 260 (76 per cent) of them average costs fell (according to the definitions in paragraph 14): at only 219 (64 per cent) did both productivity and average costs improve. At the other extreme, there were 369 collieries where output fell by 2½ per cent or more. At 79 per cent of them productivity declined and at 70 per cent of them average costs rose: at 65 per cent of them both productivity and average costs deteriorated.

18. Finally, the analysis in paragraph 17 has been done with changes in financial results substituted for changes in costs. Results

[10] In terms of output only.

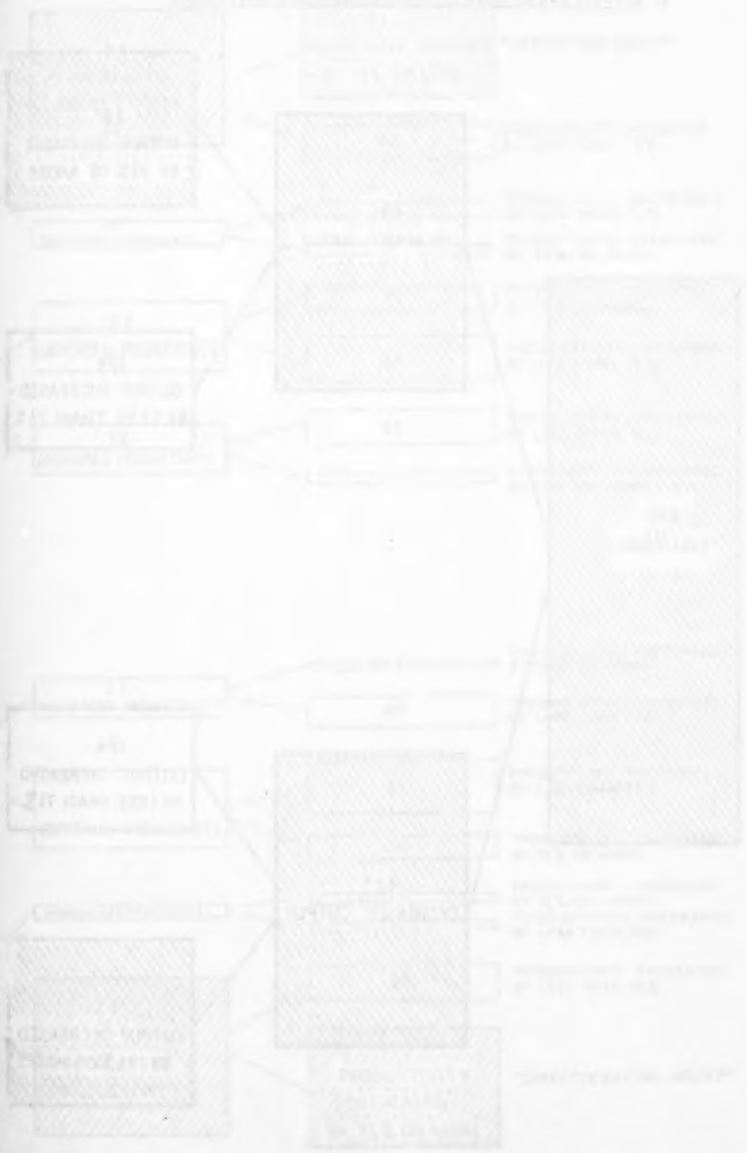
improved[11] by 2s. 6d. a ton or more at 247 collieries and deteriorated to the same extent at 330 collieries. Most of the collieries (64 per cent) where results improved were those where output and productivity also improved and the same proportion (64 per cent) of the collieries where results deteriorated also showed deterioration in output and productivity. But results do not always move 'in the same direction' as output and productivity. At 18 collieries improved results were associated with reduced output and lower productivity; and at 17 collieries results deteriorated despite higher output and productivity.

IV. CONCLUSIONS

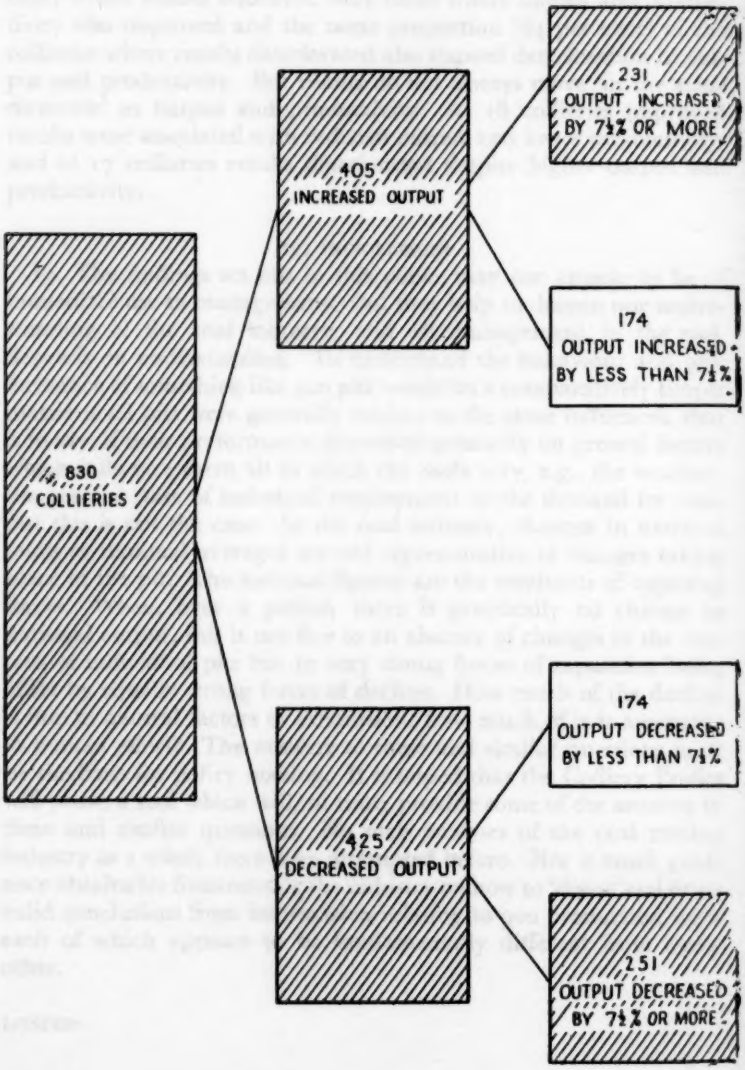
19. The findings set out in this paper may not appear to be of immediate use to management. But they help to deepen our understanding of the coal industry, and all management, in the end, depends on understanding. To understand the behaviour and performance of something like 900 pits would be a comparatively simple matter if all pits were generally subject to the same influences, that is to say, if their performance depended primarily on general factors which influence them all in much the same way, e.g., the weather, the general state of industrial employment or the demand for coal. But this is not the case. In the coal industry, changes in national totals or national averages are not representative of changes taking place at the pit. The national figures are the resultants of opposing forces. When, over a period, there is practically no change in national output, this is not due to an absence of changes in the outputs of individual pits but to very strong forces of expansion being offset by equally strong forces of decline. How much of the decline is due to natural factors of exhaustion; how much of it is amenable to human effort? The answers to these and similar questions must be the basis for policy making. It is hoped that the Colliery Profile will prove a tool which will, in time, provide some of the answers to these and similar questions. No such analyses of the coal mining industry as a whole have been attempted before. Nor is much guidance obtainable from outside the industry on how to 'digest' and draw valid conclusions from information relating to 900 production units each of which appears to be fundamentally different from every other.

LONDON

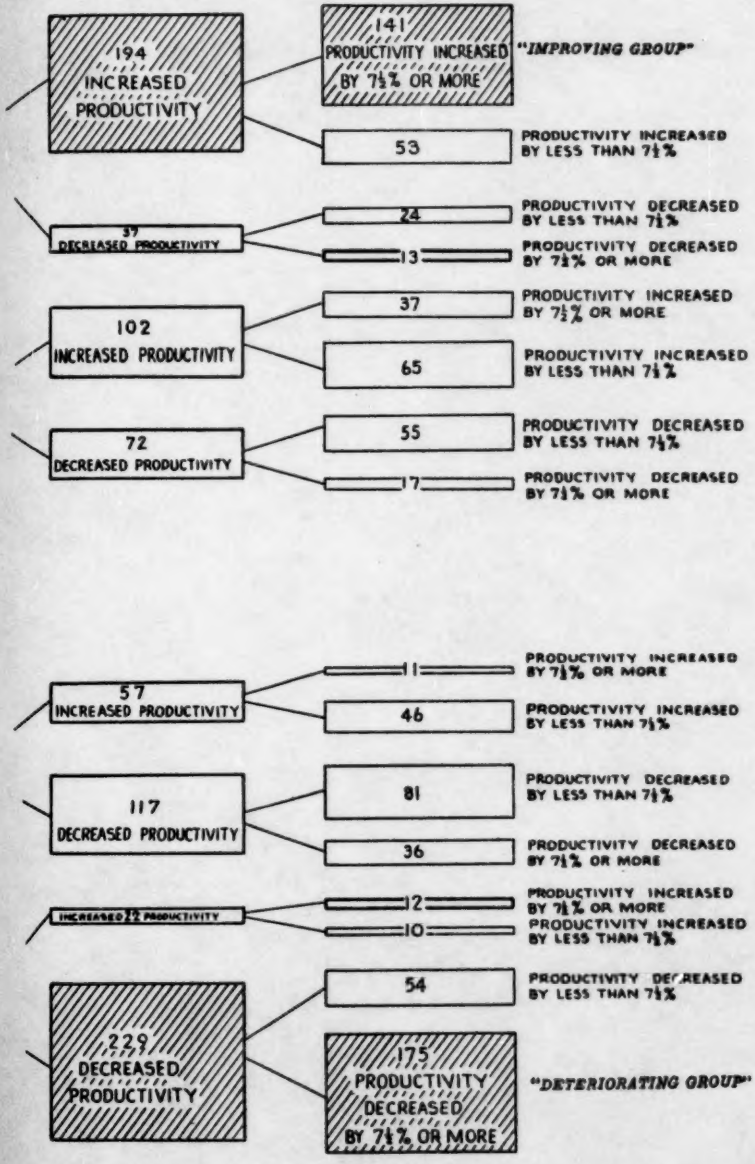
[11] An improvement in results means an increase in profits, the replacement of a loss by a profit or a decrease in losses.



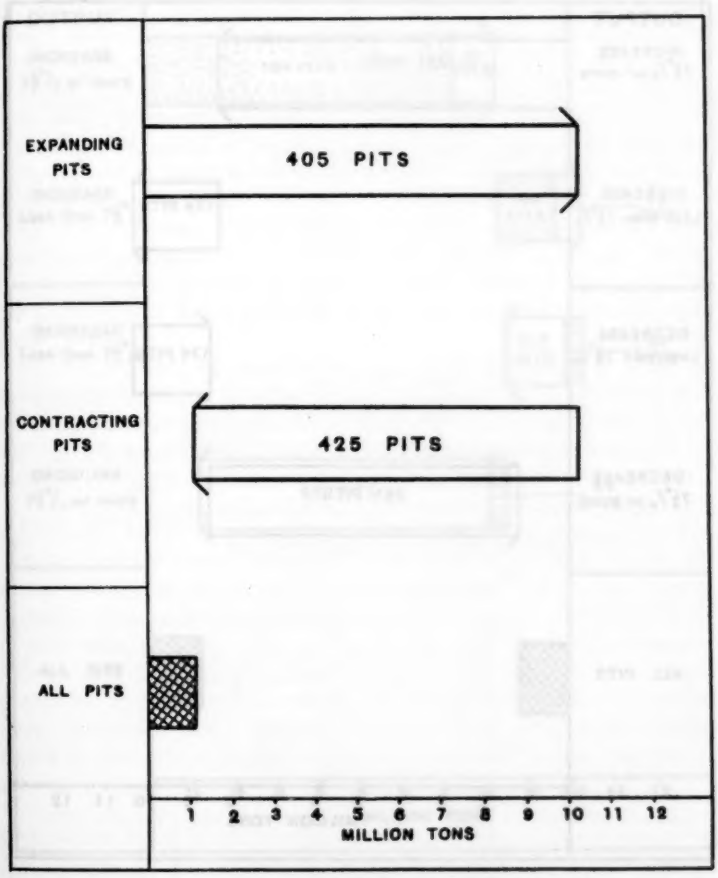
I. BREAKDOWN OF COLLIERIES



CHANGING PATTERNS OF PIT PERFORMANCES



II. DISTRIBUTION OF OUTPUT CHANGES 1951 & 1953



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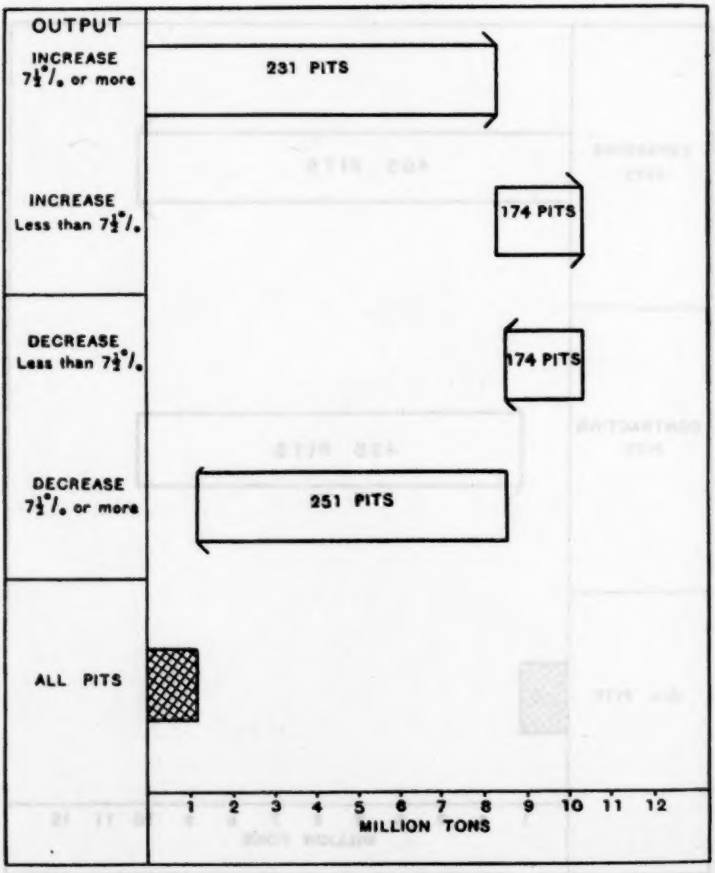
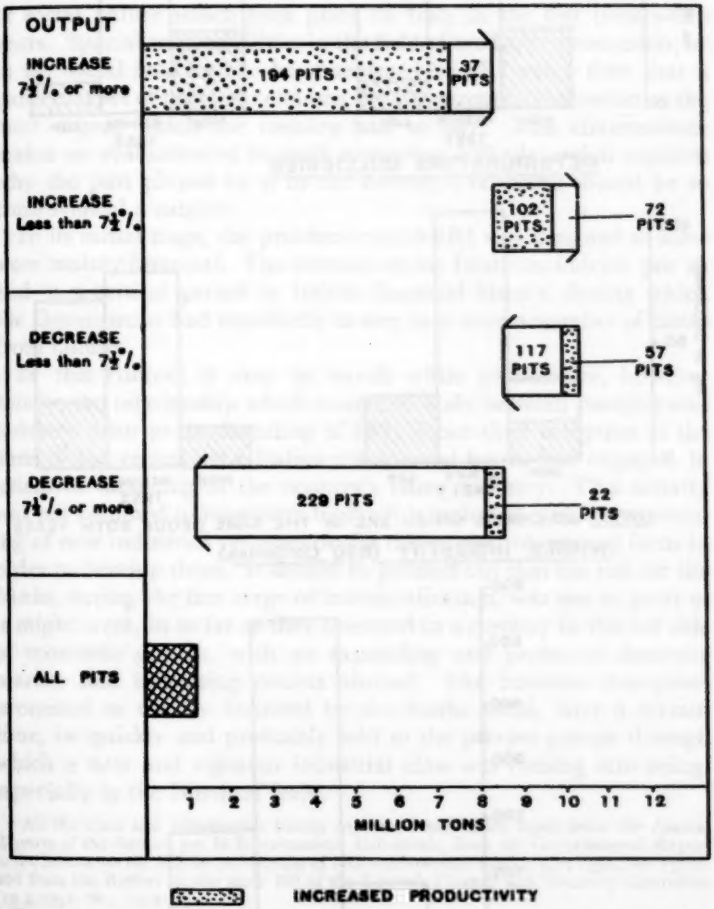
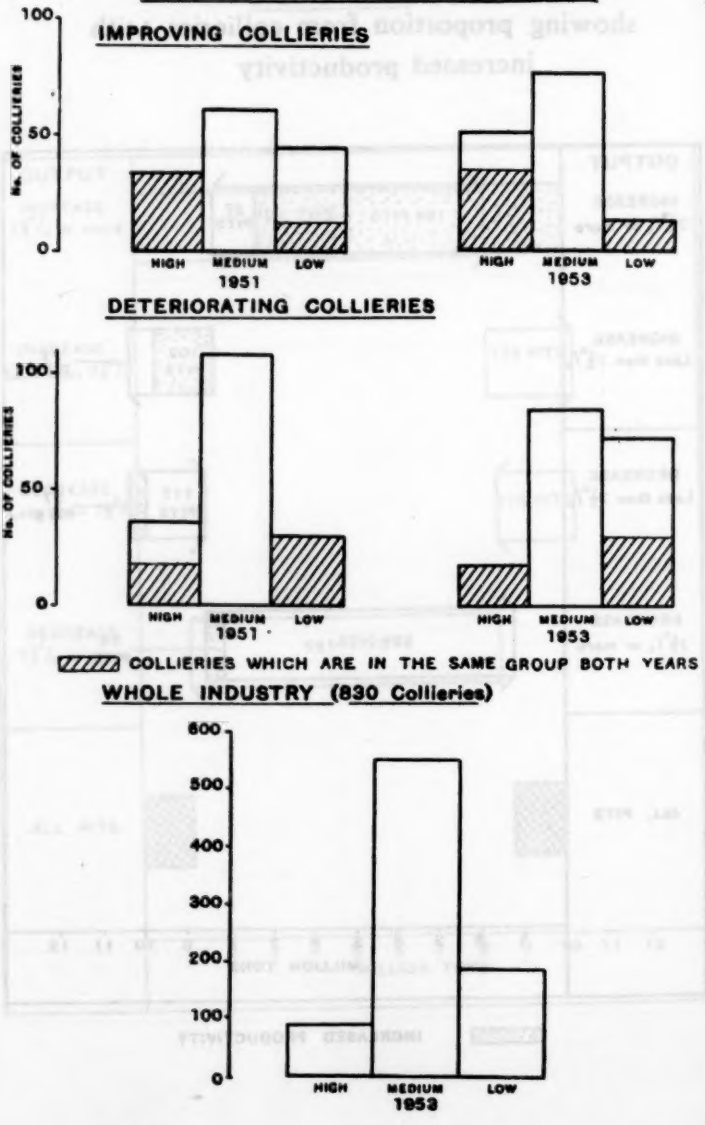


IV. DISTRIBUTION OF OUTPUT CHANGES 1951 & 1953.

showing proportion from collieries with increased productivity



V. COLLIERIES GROUPED BY PRODUCTIVITY 1951 & 1953



IRI: ITS ORIGIN AND ITS POSITION IN THE ITALIAN INDUSTRIAL ECONOMY (1933-1953)[1]

by PASQUALE SARACENO

1. *Why IRI was created; its effects on the Italian banking system*

THE activity of the Istituto per la Ricostruzione Industriale since its origin in 1933 has reflected, more than that of any other Italian public institution, the exceptional events of a financial, industrial or social nature which took place in Italy in the last twenty-five years. Special responsibilities in the field of credit, or production, or in the social field had to be shouldered by IRI every time that a particular set of problems claimed the Government's attention as the most urgent which the country had to face. This circumstance makes an evaluation of its work somewhat difficult, and it explains why the part played by it in the country's economy should be so controversial a subject.

In its initial stage, the problems which IRI was designed to solve were mainly financial. The creation of the Institute, indeed, put an end to a critical period in Italian financial history, during which the Government had repeatedly to step in to save a number of banks from failure.

In this context it may be worth while to describe, however briefly, the relationship which existed in Italy between banking and industry prior to the founding of IRI. Since their inception at the turn of the century the Italian commercial banks had engaged in extensive financing of the country's rising industry. This activity was not confined to long-term lending; it included even the promoting of new industrial ventures or the taking over of existing firms in order to develop them. It should be pointed out that the risk for the banks, during the first stage of industrialization, was not so great as it might seem, in so far as they operated in a country in the full tide of economic growth, with an expanding and protected domestic market and increasing outlets abroad. The business enterprises promoted or mainly financed by the banks could, after a certain time, be quickly and profitably sold to the private groups through which a new and vigorous industrial class was coming into being, especially in the North of Italy.

[1] All the data and information herein contained have been taken from the Annual Reports of the Istituto per la Ricostruzione Industriale, from the Governmental Report to the Senate on the Bill for an increase of IRI's endowment fund (13.10.1950, No. 1327), and from the Report on the same Bill of the Senate's Finance and Treasury Committee (12.4.1951, No. 1327-A).

This article expresses the author's personal point of view and in no way commits the Istituto per la Ricostruzione Industriale.

With the end of World War I, owing to a slow-down in the growth of the domestic market and to sharper competition on the foreign markets, the picture changed considerably and it became far more risky for the banks to handle industrial business. An understanding of the situation, however, only came with the great depression; in the meantime, namely for about ten years, the Government had in several instances come to the banks' assistance, in the belief that their difficulties were due to temporary causes and not to a deep-seated crisis of the system itself.

During the depression 1929-1933 two facts finally emerged: firstly, that it was impossible for the banks to give large-scale support to industry without assuming risks incompatible with the safe keeping of money entrusted to them by depositors; and secondly, that new functions and new responsibilities were arising for the State in the field of industrial development. This meant in practice that a general reform was needed of the structure, policies and traditions of Italian banking and of the methods of industrial financing. In other words it was recognized that emergency measures such as those hitherto adopted provided no solution and that action must be taken on a scale and in forms which, in this field, had no precedent in the country.

The instrument of the new policy was IRI. A preliminary investigation conducted by the Institute to ascertain what steps could be taken revealed that while the banks were the owners of majority holdings in many industries and financial companies, these same industries and financial companies owned, in their turn, the majority holdings of the banks. It thus emerged that a substantial part of the country's industrial and financial facilities was run, in the last analysis, not by bankers and industrialists operating with their own risk capital, but by mere executives using money provided almost entirely by the depositors of the commercial banks. And since the banks' losses were eventually covered by the State, such a situation implied in actual fact that the State itself assumed the risks (far from slight) of these undertakings while it was excluded from the profits and from exercising any influence over the management of business.

In order to straighten things out IRI had to undertake the settlement of the intricate connections existing between the commercial banks and the industrial firms, between the Government and the commercial banks, between these and the Central Bank, between this and the agencies set up to carry out prior emergency policies, and finally between the Government and the Central Bank. The objectives were:

(*a*) that commercial bank deposits be used only for short-term lending and for investments in bond securities, all other business relating to the management and long-term financing of industrial firms being transferred to IRI;

(*b*) that the capital of the banks be no longer in the hands of industrial firms or of financial companies controlled by the banks themselves; and

(*c*) that the loans granted by the Central Bank to the commercial banks for purposes of industrial financing be transferred to IRI and repaid, as quickly as possible, directly by the latter.

As a result of this complex reorganization, IRI found itself the owner of the three largest banks (which in 1936, when the banking reform was effected, were defined as banks 'of national interest'), the owner and creditor of an important group of industrial concerns, and a debtor of the Central Bank.

The magnitude of the transaction is evidenced by the following data: The aggregate industrial loans and participations turned over to IRI by the banks totalled approximately 1000 billion lire at present-day values. The sum was credited to them by IRI to enable them to restore the depositors' money which had been used to finance such enterprises. This meant that the banks exchanged a mass of shares and loans, estimated at about 1000 billion of present-day lire, against a credit towards IRI for the same amount. The threefold result was of re-establishing: (1) the capital structure of the banks, in that their credit towards IRI could be considered a sound investment; (2) their liquidity, in that such credit was convertible into cash in the case of sizeable withdrawals of deposits; and (3) their economic position, since their credit yielded a steady and adequate income, which their previous investments certainly had not done.

The real value of these aggregate investments, amounting as we said to 1000 billion of present-day lire, was estimated, however, at only about half the sum. The loss for the State can therefore be estimated at 500 billion and if the losses previously incurred to save the banks from failure are also taken into account, the burden represented by the banks' 'reclamation' after the first world war amounted altogether to 750 billion of present-day lire. It should at once be added, however, that the loss was covered by the Government by appropriating a sum to be paid to IRI in yearly instalments over a period of thirty-nine years.[1] With the progress of inflation in

[1] Ending in 1971.

1940-1947 these yearly payments were effected largely in devaluated currency, so that the cost to the State has actually been very much lower.

The size of the banks' commitments with industry is indicated by the fact that, as against the 1000 billion which represented the investments turned over to IRI, they held deposits for an aggregate amount of only 1180 billion of present-day lire, which means that such investments were as much as 85 per cent of total deposits. However, the banks had to a considerable extent resorted to the Central Bank, from which they had obtained an additional 420 billion lire in advances and rediscounts. A major part of this debt was also transferred to IRI.

Altogether, the debt towards the Central Bank assumed by IRI in substitution of the commercial banks was (including minor items) 7.5 billion — a figure equivalent to almost 630 billion today. This shows the magnitude of IRI's action also with regard to the Central Bank, whose illiquidity had revealed itself to be hardly less serious than that of the big banks themselves.

IRI's debt with the Central Bank was repaid very soon (by the end of 1936), with the result that all connection between the volume of currency circulation and the mass of tied-up industrial holdings concentrated in IRI's hands was eliminated. The debt towards the banks was to be refunded over a maximum period of twenty years — starting December 31st, 1933 — this being considered a sufficient time for the winding up of the complex operations entailed. Such repayment was completed by December 31st, 1953, according to plan.

In 1934 the big Italian banks entered, then, upon a new phase, characterized by a steady expansion of their activity in the field of commercial lending, which henceforth engaged the whole of their resources. Thus a major result achieved by IRI was that of returning the banks to their proper function of providing short-term credit — an activity which before 1933 had been largely sacrificed in favour of a small group of concerns controlled by the banks themselves to which they gave first priority against the mass of small and medium-sized firms.

It can therefore be seen that IRI, whose mere name is enough to conjure up the picture of massive Government interference in business, has actually been an agent in developing and protecting medium and small private enterprise. Through rehabilitation of the banking system, the resources of the big banks, formerly monopolized by a restricted group of large firms, were placed in fact at the disposal of all the country's producers.

2. *IRI's activity up to the end of post-war reconstruction*

A backward glance at the work performed by the Institute in the twenty-odd years of its existence will show that it went through four, fairly distinct phases:

(*a*) an initial phase, in which the main effort was devoted to the disposal of assets taken over from the banks. This first phase lasted from 1933 to 1937, when IRI was transformed from a temporary agency for the liquidation of the consequences of the banking crisis into a permanent agency for the management of State-controlled firms;

(*b*) a second phase, in which the firms remaining under IRI control were reorganized. This may be regarded as covering the years 1938 to 1944, though as a matter of fact after 1942 the increasing difficulty of obtaining supplies from abroad, especially of coal, and heavy bombing of the Italian industrial centres caused a slow-down of the country's industrial production and finally led, in 1943, to a complete paralysis which continued through 1944;

(*c*) a third phase, covering the years 1945 to 1948, in which the activity of IRI was deeply affected by the problems of post-war reconstruction;

(*d*) a fourth phase, in which new developments were planned by the Government and programmes were undertaken which for the main part were completed by the end of 1953.

The first phase reflected IRI's function as an emergency institution, set up for the immediate purpose of relieving the banks of their industrial holdings and returning these to private groups, and whose operations (basically a disinvestment procedure) were to be brought to a close in the shortest possible time. The results of these operations may be summarized as follows: Sales of assets in the period 1933-1936 totalled 261 billion of present-day lire; as compared to forecasts made in 1934 the sale of such assets resulted in a profit of 22 billion lire. This specific activity of disinvestment did not, however, come to an end with the transformation of IRI into a permanent agency. Indeed it continues to this day, and its importance is evidenced by the fact that the total figure for sales after 1936, and through 1953, was 209 billion of present-day lire,[1] with a profit of 40 billion. Altogether, sales of assets have amounted to 470 billion, with a profit of 62 billion. The proceeds of sales effected in the initial

[1] Since 1933 – when the banks' industrial investments were taken over – the proceeds of sales increasingly included assets resulting from investments subsequently made by IRI in order to develop the various firms.

period were mainly used to repay short-term debts,[4] particularly with the Central Bank.

The second phase of the Institute's activity, with its conversion into a permanent agency, began in 1937, only four years after it had been founded. This change indicates, in essence, that the situation which IRI had been designed to meet had entirely altered, or at any rate that the objective of liquidating all the assets taken over from the banks had been abandoned.

In 1937 it was realized that an important section of the holdings transferred to IRI, especially the engineering, steel, and shipping holdings, could not be turned over to private enterprise in so far as the risks involved were too big and the capital requirements (in relation, of course, to the possibilities offered by the Italian economy) too high. With regard to another section — mainly represented by the banks and by public services — it is true that potential buyers could be found but their number was a very small one, so small indeed that it was definitely felt these assets could not be returned to private capital without creating an excessive concentration of power in private hands.

This second phase covered, as already mentioned, eight years, namely from 1937 when IRI was converted into a permanent institution, to 1944. During this period a number of new investments were effected totalling 217 billion of present-day lire, most of which were financed out of the proceeds from sales of assets amounting altogether to 195 billion. Investments made by the firms were much larger, and the needed capital was mainly provided by themselves through direct borrowing, bond and share issues, and self-financing.

It should be emphasized that the policy of self-financing pursued in this period — particularly by the mechanical and steel companies, which were profiting the most from war-time conditions — and in general the financial consequences of dissociating the banks from industry helped to prevent the large-scale freezing of investment funds which had weighed so heavily on the Italian economy in the years immediately following the first world war. True, our industry did undergo a serious post-war crisis also after 1945, but it was caused by an excess of manpower and by the difficulties of reconversion and not by the dead weight of tied-up investments, which the banks had financed under the stress of war-time industrial expansion.

In this period, however, the fact which stands out as perhaps the

[4] A synopsis of the operations carried out to improve IRI's financial position will be found in the Institute's Annual Report for 1942, p. 37.

most significant is that IRI's investment policy was implemented without any financial contribution from the Government.

The third period — that of reconstruction — started in 1945 and ended in 1948, covering roughly four years.

The magnitude of the task which had to be undertaken will easily be appreciated if we bear in mind that the war-damage to IRI's industrial centres was far more extensive than that suffered by other groups or in other sectors of the Italian economy. The reasons for this were that IRI's main industrial holdings included a large part of the Italian merchant fleet, all the blast furnaces existing in the country and most of the steel-making facilities, located on the Tyrrhenian coast where some of the worst fighting took place, and a number of plants for heavy mechanical production, all of which represented a choice target for air-raiding, pillage, sabotage, and destruction generally.[5]

The capital required for reconstruction purposes and to cover losses was considerable and in fact much larger than the individual companies could have obtained directly from the market. IRI was therefore called upon — to a much greater extent than any other financial group — to supplement the firms' resources out of its own funds.

Table I is a synopsis of requirements in the various sectors during the period of post-war reconstruction (1945-1948).[6]

3. *The programmes carried out in* 1949-1953

By 1949 the post-war economic situation had assumed a more definite shape, and new development policies began to influence — and new projects to fit into — the rehabilitation programmes which IRI had still under way.

[5] In the steel sector, the disruption of the Ilva mills at Piombino and Portoferraio in Tuscany and at Bagnoli, Naples, had brought pig iron output practically to a standstill (from 1,050,000 to 60,000 tons) and reduced steel output by more than half (from 1,650,000 to 750,000 tons). Moreover, the entire equipment of a new mill set up by SIAC at Cornigliano, Genoa, with an estimated capacity of about 400,000 tons for pig iron and about 450,000 for steel, had been looted by the Germans.

In the mechanical engineering sector, employing 70,000 workers, heavy bombing, sabotage, looting, etc., had reduced capacity to less than one-third.

The losses suffered by the IRI shipping companies, which owned 85 per cent of the Italian liner tonnage before the war, had been enormous: out of a pre-war fleet of 204 ships totalling 1,345,000 gross tons, only 16 were left, amounting altogether to 107,806 gross tons.

As to the hydro-electric companies, their level of output which in 1940-1942 was about 3.6 billion kWh yearly, representing a fifth of the national hydro-electric power production, fell immediately after the war to a bare 2.2 billion kWh yearly as a result of heavy damage. Enormous damages were also suffered by the three telephone companies under IRI control.

[6] Annual Reports of IRI for the years 1945 to 1948. It should be pointed out that the data for banking represents IRI'S contribution towards the banks' capital increases. This contribution is therefore of an essentially different nature from IRI financing of its other subsidiary firms.

TABLE I

FINANCIAL REQUIREMENTS OF IRI-CONTROLLED COMPANIES DURING POST-WAR RECONSTRUCTION, 1945-1948

(in billions of 1953 lire)

Companies	*Supplied by IRI*	*Supplied by market*	*Total*
Electric power	3.3	6.3	9.6
Telephones	1.7	9.9	11.6
Shipping	13.3	18.0	31.3
Steel	9.6	24.7	34.3
Mechanical and shipbuilding	95.0	4.5	99.5
Banking	0.4	—	0.4
Miscellaneous	6.9	1.2	8.1
	130.2	64.6	194.8

The sector which engaged the activity and the financial resources of IRI to the greatest extent was the *shipbuilding* and *mechanical* sector. It should be indicated that the mechanical and shipbuilding capacity at present under State management is controlled not only through IRI but also through FIM.[7] The ratio of such aggregate capacity to the country's total is:

Shipbuilding	80 per cent
Rolling stock	40 „
Prime movers	45 „
Low-current electrical apparatus and electronics	40 „
Trucks and buses	25 „
Electro-mechanical manufacturing	35 „
Precision equipment	25 „
Farm tractors	25 „

Minor items, representing 20-25 per cent of the group's output, are not included in this list in so far as their ratio to the national production is relatively small.

The mechanical firms controlled by IRI employ about 77,000, or 13 per cent of all the workers and employees in the Italian mechanical industries – a figure which rises to 34 per cent of the total if we consider only the firms employing over 1000. If we add the firms controlled by FIM, the distribution by sectors of workers in State-controlled mechanical companies is shown in Table II.

These data show the prominent part played by shipbuilding and related industries. As regards the opportunities for work in this sector it must be kept in mind that the Italian merchant marine has at present (end of 1954) a gross tonnage of almost 4 million, and this

[7] Fondo Industrie Meccaniche – a minor agency of a temporary character for the assistance and conversion of private-owned engineering industries.

TABLE II

DISTRIBUTION OF WORKERS IN IRI AND FIM MECHANICAL FIRMS AT THE END OF 1953

	Total		*Percentage distribution*
Shipbuilding	23,650	26.9	
Marine engines and other marine equipment	4,300	4.9	
Ship repair	4,500	5.1	
Total shipbuilding and allied		32,450	36.9
Rolling stock (including repairs)		6,300	7.2
Cars and motors (including micro-motors)		7,500	8.5
Tractors		2,550	2.9
Electromechanical products and electronics		13,350	15.2
Precision equipment		2,300	2.6
Aircraft		1,500	1.7
Foundries and sundry mechanical products (textile machinery, machine tools, etc.)		22,000	25.0
		87,950	100.0

includes several newly constructed vessels which have recently entered service.[1] As, moreover, the policy of purchasing second-hand vessels abroad will in all likelihood be continued, it is estimated that ordinary replacement and development needs in the near future will absorb about 100,000 gross tons per annum of the country's shipyard capacity. Now this capacity is above 300,000 tons yearly, 75 per cent of which is owned by IRI. The main reason for this huge discrepancy is that shipbuilding facilities before the war had been expanded to meet, among other things, the Navy's growing requirements (to the extent that between 1919 and 1938 about 50 per cent of the aggregate tonnage built for domestic purposes was represented by military orders). A further expansion was brought about after the war through technical improvement and the higher levels of productivity attained as a result. A large capacity has thus come into existence, which can be utilized for the production of exportable goods.

The same thing occurred with regard to some of the engineering companies other than shipyards. In this case many of the factories had been set up to meet war-time requirements or had been equipped to produce extensively for military purposes. Those which switched over to manufacturing consumer goods such as motor-cars, motor-scooters, etc., were able to regain their economic equilibrium. Others, which were converted to manufacturing of capital goods, are now in a different and less fortunate position; and all the more so as the rate of expansion of the home market for capital goods, which is itself dependent on the general progress of the country's

[1] In the Italian merchant marine the average age was 20 years just before the war, whereas in 1953 it was about 15. While several ships are quite new, about one-third of the total are more than 25 years old. Also, out of a gross tonnage of 1.9 million of cargo vessels, 43 per cent is represented by ships of inferior quality (Liberty).

economy, is not such as to allow full utilization of present capacity to be achieved in a short time.

It is the case of the shipyards all over again — many of the engineering companies must find outlets abroad for a large part of the capacity now lying idle. And it is hardly necessary to point out how difficult and delicate a process of readjustment is involved when a firm is expected to switch over from the most comfortable of markets, the selling to Government agencies in time of war and of rising inflation, to that most exacting one — the export market for capital goods, in which the most advanced industrial countries enter as competitors.

If we want an explanation as to why the financial requirements of the mechanical sector should be so high, and investments in it so risky, it is amply provided by two factors — the need for extensive investment for conversion purposes and the need for increasing foreign outlets. Hence the preference shown by private enterprise in Italy for other branches of production, having the two-fold advantage of easier manufacturing problems and of a ready-made home market. Private investment in mechanical industry has therefore been small compared to the opportunities it offered after the end of the war.

Among the results of Government intervention (through the instrumentality of IRI) in the field of mechanical production it is worth noting that in the five-year period 1949-1953 following the stabilization of the currency, the volume of sales per worker in IRI's mechanical firms increased from below 800,000 to over 2,200,000 lire a year, namely almost three times. Over this period IRI's financial support to these firms steadily decreased from 42 billion lire in 1948 to 15 billion in 1953.

A major point that should be kept in mind in considering Government action in the engineering field is that IRI and FIM mechanical workers add up to about 90,000 and that these workers are employed by firms which private enterprise had abandoned and whose fate, as a consequence, is entrusted to the entrepreneurial ability of public agencies. Such firms are mainly end-producers, that is to say they are firms producing goods which embody a wide range of finished and semi-finished products supplied by other industries. To the above figure of 90,000 we should therefore add another 100,000, namely the number of workers employed by these industries — mostly mechanical firms — whose activity is conditioned by the existence of the end-producing companies the responsibility for which has fallen to the Government. The importance of this mass of about 200,000 workers, concentrated in a few centres, to a crowd

of consumer goods industries must also be taken into account in assessing the grounds for Government action, undertaken through IRI in this field.

The situation in the remaining sectors under IRI control is a normal one, and these sectors are in fact in the process of expanding considerably.

A *steel* investment programme which is now in its final stage is designed to concentrate mass production in the three big integrated mills at Bagnoli, Piombino and Cornigliano, belonging to the firms grouped under the Finsider holding company. The estimated output of the group on completion of this programme will be 1,200,000 tons of pig iron and 2,800,000 tons of crude steel (representing 68 per cent and 45 per cent respectively of the national output). In 1953, production amounted to 832,000 tons for pig iron and 1,566,000 tons for steel, namely it was, respectively, 25 per cent and 50 per cent higher than pre-war. The policy of cost reduction pursued through the Finsider programme has become a pressing need since Italy signed the Treaty of the European Coal and Steel Community.

With regard to *shipping*, the companies of prime national interest which IRI controls through the Finmare holding company have nearly completed a vast re-equipment programme, including the purchase of twenty-two new vessels of a total of 248,200 gross tons. Twenty of these ships, totalling 239,300 gross tons, had entered service by 1954. The remaining two will be ready in 1955, and with their addition the Finmare companies will have a fleet of eighty-six ships, for the main part of a high technical efficiency, totalling 612,846 gross tons.

Another important group of IRI holdings is represented by *public utilities*: electric power and telephone companies and the Italian Broadcasting Corporation (RAI).

IRI investments in the *electrical* field between 1948 and 1953 included the construction of new hydro-electric plants having a capacity of about 925,000 kW and an average yearly output of about 2,500 million kWh. This raised the group's total installed power as at December 31st, 1953, to 2,368,000 kW and brought the average output capacity to 8289 million kWh a year, which figures represented over 25 per cent of the national total. Other hydro-electric plants which are currently being built will contribute another 565,000 kW and an average output capacity of 1600 million kWh, and when these are also in operation, IRI capacity will be more than 250 per cent of what it was before the war.

An indication of the progress made in the *telephone* sector by the

companies under IRI control is afforded by the number of users, which rose by more than 90 per cent between the end of 1948 and the end of 1953, namely from 426,212 to 814,500, which latter figure represented 60 per cent of the national total.

In the *broadcasting and television* sector IRI has the control of RAI, which exclusively operates the national broadcasting and TV services. The progress made by the company over the last five years is shown, also, in this case, by the figure for radio-subscribers, which increased from 2,200,000 at the end of 1948 to 4,800,000 at the end of 1953, with a rise of 118 per cent. In this latter year a first nucleus of TV transmitting facilities was completed and a regular service was started.

IRI is also directly interested in the two Italian airline companies (which operate all the national services as well as important international ones), in mining, and in road-building. Another field in which IRI is active is that of cement production. To the four plants previously in existence in various parts of Italy a fifth one has recently been added in the Naples area, for the specific purpose of increasing cement availability in the Southern regions which, as is known, are now being developed. With the completion of these new facilities, IRI production of cement currently amounts to 25 and 10 per cent respectively of Southern Italian and of national output. Mention must also be made of the Institute's participation in the largest Italian chemical concern (Montecatini) amounting to 8 per cent of the company's capital.

As might be expected, IRI's function with regard to banking is of a somewhat special nature. This sector includes the three big banks termed 'of national interest'. After the reorganization carried out in 1933, described earlier in this survey, this section of Italian banking has steadily consolidated its position through commercial lending distributed over a large number of operations in every part of the country and in every branch of economic activity, in contrast to the policy followed up to 1933.

The deposits held by the banks of the IRI group represent more than 25 per cent of the deposits of the Italian banking system as a whole.

4. *IRI's position in the Italian economy*

The financial requirements of IRI's subsidiary companies over the five-year period 1949-1953 were covered by IRI and by the market in the proportions indicated in Table III.

IRI also contributed to the capital increases of firms in which it only has minority holdings, aggregating 3.9 billion lire.

TABLE III

FINANCING OF IRI COMPANIES IN 1949-1953

Companies	*Supplied by IRI*	*Supplied by market*	*Total*
		(billions of current lire)	
Electric power	14.9	105.9	120.8
Telephones	6.6	45.1	51.7
Shipping	35.1	64.8	99.9
Steel	58.2	93.5	151.7
Other Cos.	16.0	12.9	*28.9
	130.8	322.2	453.0
Mechanical	100.2	21.4	121.6
General total	231.0	343.6	574.6

* The figure breaks down as follows: banking, 4.2; radio, 5.3; mining, chemicals and miscellaneous, 19.4.

If we leave aside the engineering companies — which, owing to their critical post-war situation, could not avail themselves of normal market financing — it will be seen from the above figures that the group's capital requirement was met by IRI for the amount of about 131 billion lire, a figure which represents approximately 29 per cent of the total requirement of 453 billion of the non-mechanical sectors. In other words, for every lira contributed by IRI about 3 lire came from the market.

IRI's own requirements of 578.5 billion lire were covered, in their turn, partly with funds obtained from the market and partly with funds directly or indirectly supplied by the Government. Table IV shows the ratio of market to Government financing.

TABLE IV

SOURCES DRAWN UPON FOR IRI'S FINANCIAL REQUIREMENTS IN 1949-1953

Sources of financing	*Billions of current lire*		*Percentage*
Government			
Increase of IRI endowment fund	60.0	10.37	
Special transactions (ERP loans, etc.)	108.5	18.76	
	168.5		29.13
Market			
Shares sold to public	41.7	7.20	
Sales of assets	10.1	1.75	
Long-term borrowing and bond issues	230.8	39.90	
Short-term borrowing and other minor sources	127.4	22.02	
	410.0		70.87
Total	578.5		100.00

These data show that 29.13 per cent of the group's total requirements were covered by means of funds supplied, either directly or indirectly, by the Government, while the remaining 70.87 per cent

were obtained from the market by means of share issues, borrowing, sales of assets, etc. A point worthy of note is that the 410 billion provided by the market represents 11 per cent of total national investment in private activities, as appears from the national balance sheet of monetary transactions made out by the Bank of Italy for the five years 1949-1953.[9]

An indication of the importance of the IRI group with respect to the country's economy can be found in Table V, in which the number of workers and employees in each IRI sector at the end of 1951 is compared with the national figure for the same sector.[10] The sectors considered are those in which IRI has majority holdings.

TABLE V

NUMBER OF EMPLOYED IN IRI FIRMS AND IN CORRESPONDING NATIONAL SECTORS AS AT 31.12.51*

Companies	*Total number of employed*	*Number of employed in IRI firms*	*Percentage IRI/total*
Mechanical	605,000 (*a*)	80,600	13.3
Metals	115,000 (*b*)	56,000	47.8
Shipping	22,800 (*c*)	11,100	48.6
Electric power (*d*)	52,000(*e*)	19,800	36.2
Telephones	16,000(*f*)	11,200	71.9
Banking	85,000 (*g*)	26,000	30.6
Miscellaneous	2,604,200	13,400	0.5
Total	3,500,000 (*h*)	218,100	6.2

* *Source:* E. Rossi, *Lo Stato industriale*, Bari 1953, p. 83.

(*a*) In the case of firms employing 10 or more, the figure includes both workers and employees, the latter being estimated at 15.5 per cent of the former.

(*b*) Includes the number of workers, as published by the Ministry of Labour, plus the number of employees, which has been estimated at 17 per cent of the workers.

(*c*) Excluding workers and employees in airline companies, estimated at 1300.

(*d*) Including RAI (radio and TV).

(*e*) To the figure published by the Ministry of Labour for workers has been added the figure for employees, estimated at 5 per cent of the former.

(*f*) Estimated by 'Confindustria' (Italian Manufacturers' Association) for 1949 at 15,700.

(*g*) Estimated by the Italian Bankers' Association.

(*h*) This figure has been obtained by deducting the number of artisans, estimated at 1,300,000.

It will be seen that the number of workers and employees in the various IRI sectors was on average 6.2 per cent of the national

[9] In the five-year period 1949-1953, funds invested in *private economic activities* as contrasted to investments in *public activities* amounted to a total of 3725 billion lire (see Bank of Italy, Annual Reports for 1951, p. 269; for 1952, p. 374; and for 1953, p. 364).

[10] The reason why such a comparison has been made for 1951 and not for a later date is that the national figures for employment in the various sectors are those given by the November 1951 Census. The latter figures—and hence the percentages – should in any case be considered as approximate in view of the fact that the analytical returns of the census are not yet available and it cannot therefore be established whether the two sets of figures are always strictly comparable.

total. As was just pointed out, the IRI group absorbed 11 per cent of the total funds invested in private economic activities in the five-year period under review. The discrepancy between the two percentages may be ascribed to the fact that the average structure of the sectors under IRI control is relatively capital-intensive and that investment per worker is correspondingly high.

Also indicative of the group's importance in the various branches of industry we are considering is the proportion between the capital of each sector under IRI control and the capital of the corresponding sector of the Italian economy (see Table VI). The average ratio is 16.7 per cent — with some qualifications, however. Firstly, whereas all IRI firms are joint-stock companies, many private firms have a different legal status and are therefore excluded from this comparison. Secondly, the IRI firms are mostly grouped under financial holding companies such as Finmare, Finmeccanica, etc., which fact involves duplication in calculating capital — a less frequent circumstance in the case of non-IRI firms.

TABLE VI

CAPITAL OF IRI FIRMS AS AT 31.12.51*
(millions of lire)

Companies	*Nominal capital of Italian joint-stock companies*	*Nominal capital of IRI firms*	*Percentage IRI/total*
Banks and other financial institutions	20,505	5,700	27.8
Metals	72,231	36,900	51.1
Mechanical	158,656	42,266	26.7
Electric power	350,041	77,202	22.0
Sea transportation	30,553	24,100	78.9
Telephones	39,115	21,000	53.7
Agricultural concerns	11,142	1,767	15.9
Mining and chemicals	167,265	2,256	1.3
Miscellaneous	443,568	4,443	1.0
Total	1,293,076	215,634	16.7

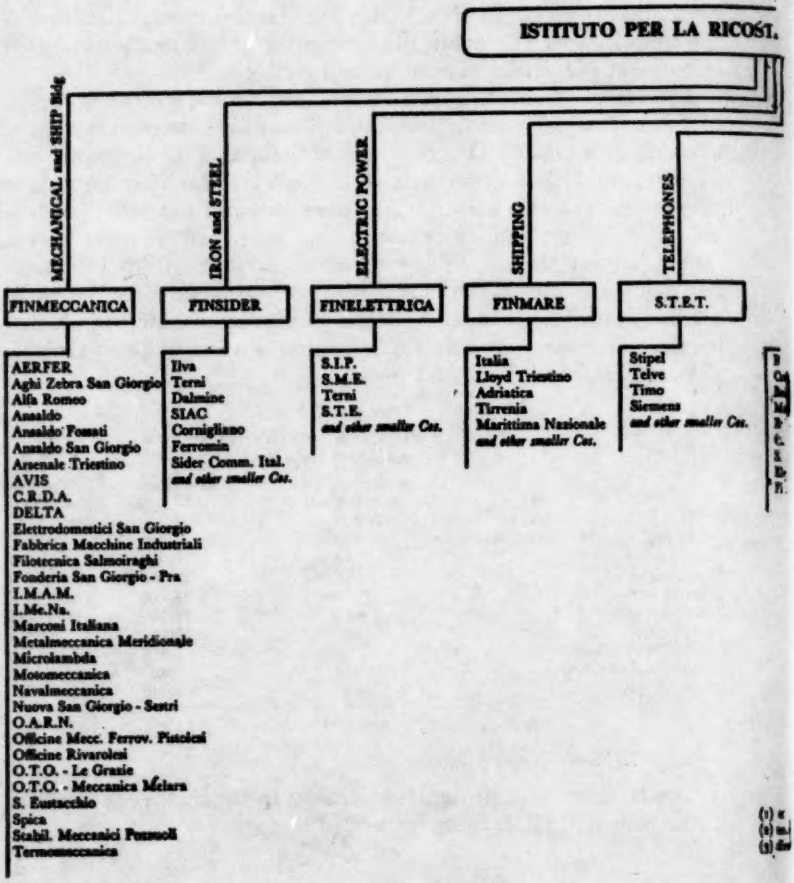
* *Source:* E. Rossi, op. cit., p. 84.

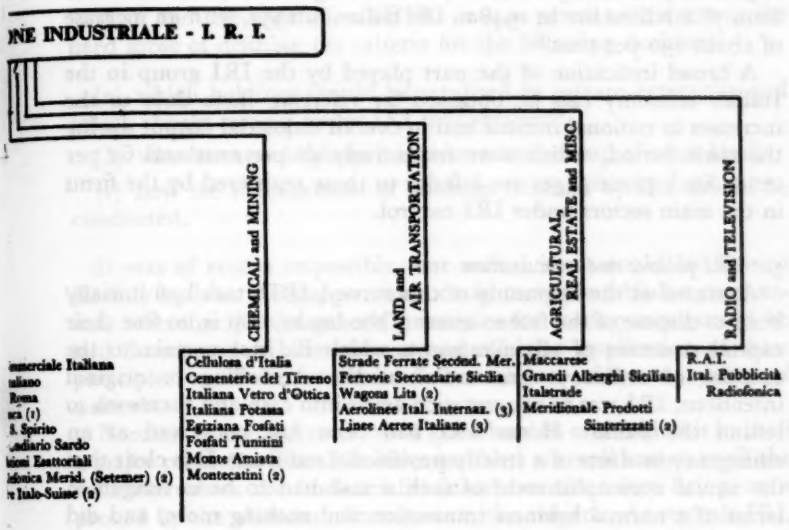
Finally, here are some figures indicating the increase in production in the principal IRI sectors from 1948 to 1953:

	1948	1953	*Percentage increases*
Steel (thousands of tons of crude steel) (*a*)	918.0	1,566.0	+ 70.5
Shipping (freight and passenger income in billions of 1953 lire) (*b*)	30.1	55.0	+ 82.7
Electric power (billions of kWh)	5.4	8.1	+ 50.0
Telephones (thousands of subscribers as at December 31st)	426.1	814.5	+ 91.0

(*a*) Crude steel production has been taken as an index for the activity of the steel sector, as generally adopted by international agencies such as OEEC, ECE, etc. It should be pointed out that the increase in pig iron output for the period considered was 447 per cent.

(*b*) The conversion of 1948 into 1953 lire is based on the 1953 index for Conference freight rates, which is 109 (1948=100), considering the passenger rates as unvaried.


ISTITUTO PER LA RICOSTR.
MECHANICAL and SHIP Bldg
IRON and STEEL
ELECTRIC POWER
SHIPPING
TELEPHONES
FINMECCANICA
FINSIDER
FINELETTRICA
FINMARE
S.T.E.T.
AERFER
Aghi Zebra San Giorgio
Alfa Romeo
Ansaldo
Ansaldo Fossati
Ansaldo San Giorgio
Arsenale Triestino
AVIS
C.R.D.A.
DELTA
Elettrodomestici San Giorgio
Fabbrica Macchine Industriali
Filotecnica Salmoiraghi
Fonderia San Giorgio - Pra
I.M.A.M.
I.Me.Na.
Marconi Italiana
Metalmeccanica Meridionale
Microlambda
Motomeccanica
Navalmeccanica
Nuova San Giorgio - Sestri
O.A.R.N.
Officine Mecc. Ferrov. Pistoiesi
Officine Rivarolesi
O.T.O. - Le Grazie
O.T.O. - Meccanica Melara
S. Eustacchio
Spica
Stabil. Meccanici Pozzuoli
Termomeccanica
Ilva
Terni
Dalmine
SIAC
Cornigliano
Ferromin
Sider Comm. Ital.
and other smaller Cos.
S.I.P.
S.M.E.
Terni
S.T.E.
and other smaller Cos.
Italia
Lloyd Triestino
Adriatica
Tirrenia
Marittima Nazionale
and other smaller Cos.
Stipel
Telve
Timo
Siemens
and other smaller Cos.



) owned by Banca Commerciale Italiana, Credito Italiano and Banco di Roma.
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December 1954

For the mechanical and shipbuilding firms a meaningful index is difficult to find in view of the number and variety of their activities. A general pointer is provided by the total figure for sales, which rose from 78.2 billion lire in 1948 to 180 billion in 1953, with an increase of about 130 per cent.[11]

A broad indication of the part played by the IRI group in the Italian economy can be obtained by referring these data to the increases in national income and in overall industrial output during the same period, which were respectively 42 per cent and 61 per cent. Such percentages are inferior to those registered by the firms in the main sectors under IRI control.

5. *IRI policies and organization*

As stated at the beginning of this survey, IRI's task had initially been to dispose of the frozen assets of the banks, that is, to free their capital structure of all investments which did not pertain to the exercise of ordinary commercial credit. According to original intentions, IRI was to convert such assets into cash and therewith to refund the banks. Hence IRI had been first conceived as an emergency institute of a strictly provisional nature.[12] It is clear that the actual accomplishment of such a task had to be envisaged in terms of a normal business transaction and nothing more, and did not entail, where the Institute was concerned, any special problem. There was no question of carrying into effect new organizational conceptions or of formulating new economic policies.

In other words, the purposes of a public nature for which IRI had been created could be achieved simply by selling its assets at the highest profit, i.e., by adopting a policy no different in essence from that of a private entrepreneur. The ownership of majority holdings of industrial firms entailed heavy responsibilities which IRI, then merely a liquidating agent, was not ready to assume; hence the need to effect the sale of such assets as quickly as possible.

As already mentioned (cf. Section 2 of this article) this situation lasted only a short time, and the permanent nature of IRI and of the function it fulfilled was recognized as early as in 1937.[13] Once this function was admitted to have a much wider scope, a policy for IRI obviously could not be based on the sole criterion of profit. In Italy's economic and social system the Government does not normally engage in productive activities. And in cases when it does, it is not with a view to increasing fiscal revenue but to attain more

[11] The conversion of 1948 into 1953 lire is based on the wholesale price index for 1953 of mechanical products, which is 106.6 (1948=100).

[12] Law No. 5 of January 23rd, 1933.

[13] Law No. 905 of June 24th, 1937.

general aims which, it is believed, private enterprise is unlikely to pursue. That such aims must be attained as profitably as possible is of course implicit.

With the transformation of IRI into a permanent agency, the need arose of defining the criteria for the following decisions:

(*a*) which holdings should be returned to private enterprise and which should remain under IRI management;

(*b*) whether new holdings might be assumed and of what kind;

(*c*) how the management of holdings retained by IRI should be conducted.

It was of course impossible that such criteria could be defined directly by law. A legal provision could merely establish a mechanism, whereby: (i) the general principles for management could be laid down, and (ii) the correct and effective application of these principles could be ascertained through an adequate system of controls.

Needless to say, the creation of a mechanism of this kind is in itself a major problem. The difficulties involved are well known to all the countries where the 'industrialist State' has come into being, as is proved by the abundant literature on the subject. As regards IRI, an additional difficulty was provided by the fact that the Institute was not itself the outcome of a clear-cut decision to nationalize certain sectors of production but represented the development, originally unforeseen, of a situation which private groups, and not the State, had brought about.

Now in cases when the Government undertakes to manage, say, the country's railroads, or sets up a national insurance institute, the objectives are clearly present in the political thinking which prompts such decisions and in the technical features themselves of the activities concerned. The Government, in other words, deliberately takes over a specific activity for a specific purpose, which has been politically defined by the competent bodies. In contrast, we are confronted in the case of IRI with a variety of objectives and situations which have taken shape *after* the founding of the Institute, and it is hardly surprising that such objectives should appear at times as contradicting one another and, in general, as rather loosely defined.

During the eighteen years which followed IRI's transformation into a permanent institution this problem was widely discussed. A presentation, however summary, of the several points of view and of the arguments in favour of one or the other is beyond our scope.

The conclusions emerging not only from these debates but from IRI's action as a whole, from its present Constitution, and from expert opinion expressed in more recent years in responsible quarters, indicate three principal criteria for the maintenance by the State of the holdings concentrated in IRI.

A first group of holdings is represented by firms not yielding a profit, namely by firms that can be restored to health only by means of a financial effort exceeding the possibilities of private enterprise and which the Government deems it advisable to shoulder. Such is the case of part of the mechanical firms.

A second group is constituted by firms which, even if sound, private enterprise is not in a position to take over or continue because of the size of the capital requirements. This is mainly the case of the shipping and steel companies.

A third group includes firms yielding a profit, which could be returned to private hands but of which the Government prefers nonetheless to retain control in view of the considerable interests of a general nature involved in their management. Such are the big banks, the electric power producing companies, and telephone and radio services. The idea in this case is that since they have fallen into the hands of the Government, and the Government has organized to manage them, the *status quo* had better be maintained. This latter case is, of course, the most discussed.

To these three groups, corresponding to the three main criteria indicated above, a fourth one should be added. This comprises the firms which the Government has no reason to keep under its control and therefore are being liquidated.

Such are the fundamental concepts which, by and large, admittedly justify the existence and activity of IRI, and it is easy to see how the boundaries between one group of holdings and another may shift in relation to new developments in the general political and economic situation and to new Government policies adopted as a consequence. The group that is most sensitive to such economic and political changes is, as a matter of fact, that of the holdings earmarked for liquidation — a category which extends to holdings from the other three groups whenever the reasons which justified their being under State control are considered no longer to exist.

In contrast to the variety and fluidity of the motives for IRI management of so many and different firms, there emerges an important common feature, namely the fact that all these firms operate side by side and often in direct competition with private-owned firms. This circumstance is frequently emphasized either as an advantage or a disadvantage, according to the standpoint taken.

From the many arguments put forward one point emerges which seems to be of outstanding interest, i.e., that no privilege on the one hand and no special charge on the other should devolve on these firms by reason of their being Government property.

Discrimination in their favour — such as tax remission, low-interest financing, trade-union benefits, preferential treatment for Government orders, priority in the supply of scarce raw materials, etc. — might easily wipe private competitors off the market and resolve itself in an unwitting, as well as iniquitous, form of nationalization of an entire sector of production. Under the circumstances, the Government's policy has been to maintain the firms as ordinary joint-stock companies and to refrain from devising for them any special legal status, such as is normal, in Italy and elsewhere, for firms under public management. Their preservation as joint-stock companies has also been justified by the fact that such a status affords greater flexibility in the case of the sale of a firm to private owners; that any additional capital which may be needed can be raised by issuing shares — a form of financing which the Government cannot otherwise resort to; and lastly that a mechanism is provided which acts both as a stimulus and a control where management is concerned.

It is obvious that the burden of special charges, no less than the advantage of special privileges, must be avoided if the IRI firms are to retain their competitive character. This implies, for instance, that electricity rates cannot be lower for consumers serviced by public-owned companies than for those serviced by private-owned ones, or that workers of equal standing cannot be differently treated in the two types of firms. The aim should be to create a system in which the public-owned firm, precisely like its private counterpart, is responsible for the administration of its capital — which capital is entrusted to it by the Government in the interest of the whole community and not of a particular group of consumers or of workers. It is true, of course, that public objectives cannot always be attained without incurring liabilities of some kind (a case in point is the subsidizing of firms in critical conditions or the operating of non-profitable shipping services). When such liabilities are incurred, the financial burden involved should be specifically indicated in the company's balance sheet. This at least appears to be the ideal solution, since it permits a precise definition of the management's responsibilities and therefore obviates any tendency on the management's part to impute to liabilities of a political origin, such as those indicated above, the consequences of what failure there may be to conduct business along efficient lines.

In its essence, therefore, the whole problem of formulating a policy for IRI may be reduced to the following terms: that the considerations of overall interest which condition the management of the various firms be clearly stated, so that the public be in a position to appreciate the extent to which this overall interest affects both the operating costs and the returns of each firm. One implication of this principle is that an asset becomes eligible for liquidation whenever there are no aims of a public nature to be pursued through public ownership.

Another question of considerable importance is that of the formulation of policies by the Government and the control of their implementation. Generally speaking the suggestions which have been made in this respect imply that the forms of control which are used in private business — and which have been maintained, as indicated earlier, for IRI companies — are insufficient in the case of public-owned firms with the status of joint-stock companies, and that additional controls of the kind typically applied in public administration should also be adopted. The proposal raises some interesting points. It is emphasized that existing institutions for public control have been conceived in relation to the spending of public funds by traditional public administrations. These administrations operate on the basis of specific authorizations to collect or spend moneys, which are issued by the representative bodies concerned (Parliament, regional or municipal authorities, etc.) in the form of budgets. The controls subsequently carried out are designed to check the actual expenditure, effected by the executive bodies, against budget forecasts.

Now, it is pointed out, the position of firms such as IRI's which operate in the field of production is altogether different. Production, it is argued, is a creative activity inasmuch as it is carried out in a world which is constantly evolving, where changes are constantly taking place in the techniques of producing and marketing goods and in the level and composition of demand. It is inconceivable that such an activity should be tied down to a rigid system of budgets fixed in advance of the public administrative type. Public supervision in this case must, rather, be of a political nature, and be expressed in a set of policies which the Government lays down for the IRI group of firms.

The carrying out of subsequent controls is, on the contrary, an essentially administrative problem — which does not mean that it is any simpler than that of formulating policies. In fact, it is understandable how the very novelty of Government endeavour in this field should give rise to questions of great complexity, which are

much the same in many countries and are prompting today much earnest research.

The activity of IRI is regulated at present by a constitution approved with Law No. 51 of February 12th, 1948. According to this constitution IRI is a financial institution with a juridical figure and personality, its own capital funds distinct from the State's, an autonomous management and undelegated tasks of its own. General policy is laid down by the Council of Ministers, while major decisions regarding management and the planning of new programmes are subject to the approval of a small committee of Ministers (Interministerial Committee for Reconstruction – CIR).

Officers include: the Chairman, the Vice-Chairman, the Board and the Managing Committee.

The Board consists of the Chairman, Vice-Chairman, three financial and industrial experts (appointed by the Prime Minister); the State Accountant General, the Director-General of the Treasury, the Director-General of Public Property, the Director-General of Industry, a representative of the Postmaster-General, a Director of the Merchant Marine, a Director-General of the Labour and Social Security Ministry, and a Director-General of the Defence Ministry.

The Managing Committee is formed by the Chairman, the Vice-Chairman and the three financial and industrial experts.

The Auditing Committee includes a magistrate from the Court of Accounts who presides over it, a State Attorney, a representative of the Treasury, a representative of the Ministry of Finance and a representative of the General State Accountancy. Two substitute auditors, representing the General State Accountancy and the Court of Accounts, are also nominated.

With the evolution of IRI's functions and capital structure, its internal organization has undergone corresponding changes. When the Institute was founded, its holdings were a heterogeneous collection of assets ranging over a huge variety of economic activities – a consequence of the fact, emphasized more than once, that IRI was not created for the purpose of nationalizing certain sectors of production but to free the big banks of all investments of a kind held to be unsuitable. This heterogeneous mass, as we have seen, was greatly reduced as a result of disinvestment policy which was vigorously pursued in the first years of the Institute's existence, was resumed after the war, and is still being continued. The rate of such disinvestment varied from one sector to another according to the degree in which it was profitable and advisable to hand back the companies to private enterprise. Thus IRI sold important holdings in the textile and foods industries and in real estate, as well as

minority holdings in a variety of firms. Furthermore, a considerable volume of long-term credits, taken over from the banks, were converted into cash.

Thus, while certain sectors lost a good deal of their importance, there were others in which sales had been small and new investments were being made; and as IRI assumed a permanent character its activity was restricted to a number of essential sectors which, for the reasons already stated, remained under its control.

In facing the problem of the reorganization and development of the companies controlled by IRI, it soon became apparent that the various firms within each sector must be technically co-ordinated. As a matter of fact it was at the very start of the Institute's activity that the idea had first arisen of decentralizing management and of delegating the following tasks to a special holding company for each sector:

(*a*) technical co-ordination of the programmes relating to the various firms within the sector in question;

(*b*) financial assistance to the firms, in order to facilitate the financing of such programmes.

These tasks were of course to be carried out under the responsibility and overall supervision of IRI, the main object being to relieve the central office of such functions as required a high degree of specialization.

The process of forming homogeneous groups of firms under the control of specialized financial companies thus began immediately after IRI was founded and continued in the order of progression indicated below:

1. STET, established in 1933, to control the telephone companies;

2. FINMARE, in 1936, to control the four shipping companies of prime national interest;

3. FINSIDER, in 1937, to control the steel companies;

4. FINMECCANICA, in 1947, to control the engineering companies;

5. FINELETTRICA, in 1952, to control the electric power companies.

While IRI control in these sectors is exercised through financial holding companies, direct control is retained over the banking, chemicals, mining, and agricultural concerns, and a few others. At

the close of 1953, 87.2 per cent of all IRI assets were controlled through the financial holding companies and 12.8 per cent were controlled directly by the Institute (see chart on pp. 212-13).

It emerges from what has been set forth that the organizational development undergone by IRI has been both laborious and intense. Further proof of this can be seen in the fact that in the twenty-two years since the Institute was founded its statutes have been changed four times. It is worth noting that a fifth change is now contemplated and a new form of constitution is currently under discussion. In essence, this evolution is but the institutional reflex of the evolution which has taken place in the activity of IRI, emphasis on which was laid in the opening lines of this article.

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STRUCTURE AND PERFORMANCE IN THE TITANIUM INDUSTRY

by FRANCIS G. MASSON[1]

IF any agreement exists among economists interested in price analysis it comes to a focus on the great diversity of market situations in the economy. Those who are affected by market results within individual industries, such as profit rates, advertising, price and product behavior over time, and the like, or who are concerned with the establishment of standards of industry performance, attempt in various ways to relate market structure to market behavior, reducing the latter to a rational and predictable basis. The structural characteristics most likely to be strategic are the number and size distribution of sellers, the number and size distribution of buyers, the characteristics of the product (i.e., what the product would do for the buyer, whether it would make any difference if supplied by one seller or the other, etc.), the conditions of entry into the market, and the trend of industry demand over time.

It is usually helpful to consider the numbers issue in terms of the psychology of the seller, or of the committee or group of individuals charged with making policy for a manufacturing business. One might expect three general types of attitudes: (1) 'Other sellers would not care about what we do because there are too many for any one to feel the effects'; (2) 'There will be no reaction to what we do because our product is too different from that of our competitors'; (3) 'Any change in selling prices, sales volume, product qualities, selling efforts or production capacity might cause our competitors to take action in one or more of these areas.'

In the last case additional factors — *relative* size, etc. — would determine the possible gains from various strategies. A firm would wisely assume price leadership, and the others in the industry would follow for a time, if, for example: (1) The followers are very small producers who have no choice of prices; they cannot sell anything at prices above the price set by the leader (or above a price differing from it by a certain margin) but they can sell at this price all they care to produce; hence, they would not think of selling at a lower price.

[1] The author participated in the preparation of the *Materials Survey — Titanium* (Office of Defense Mobilization, Washington, D.C.) as a research assistant, conducting over fifty intensive interviews with policy-making officials in private industry and government. The results of the investigation appear in this forthcoming volume, and in *The Titanium Industry: A Case Study in Oligopoly and Public Policy* (doctoral dissertation, Ohio State University, 1954). Professor Clifford L. James of Ohio State University was the author's adviser on the research project which led to the preparation of his dissertation as well as this article.

(2) The followers have a choice of prices in the sense that they would lose some sales, but not all sales, by raising prices above the level set by the leader, and might gain some business by lowering prices below that level; yet, in spite of the immediate attractiveness of underselling the leader, they would refrain from doing so and inviting punishment through price raids, costly patent lawsuits or other harassing tactics.
(3) The followers have the same choice of prices as in type 2, but refrain from underselling the 'leader' not from fear of punishment by the latter but because they expect that the 'leader' would accept the lead of the audacious competitor and meet his lowered price, nullifying the effect of the move. (4) The followers have a choice of prices but — having learned that independent pricing allows the buyers to play one seller against the other, results in generally lower prices and is in the long run less lucrative than concerted action — they secretly or tacitly agree to proceed in unison, letting a stronger or smarter member of the industry act as leader of the concert.

The picture is likely to be greatly altered over a longer period by entry into the industry. As in manufacturing business the usual case of entry would seem to be a decision to expand a product line, the industry should be defined in terms of processes and machinery, not existing products: the criterion is whether other firms could offer adequate substitute products within a reasonable length of time.[1] Entry can be — and often is — forestalled or delayed by the established firms. At one time, the correct strategy will be to hold prices down for fear of motivating an outsider to broaden its line, or so as not to fatten the smaller rivals sufficiently to encourage their expansion; at another, to expand selling costs so as to raise the cost of successful invasion of the market.

In still other cases, the need for positive action may not develop because of technological changes or movements in the demand for the various product lines of the affected firms. An economic interpretation of the results in any industry can therefore be achieved only in the context of a shifting state of 'balance' occurring over time in a group of markets, revealing, wherever necessary, the technical, psychological and social aspects of this inter-firm relationship.

[1] For this idea I am, of course, indebted to P. W. S. Andrews. To quote Miss Brunner's exposition: 'The orthodox idea of competition has proceeded too much in terms of competition from other existing products rather than from other producers. For the purpose of pricing, the "industry" of which a firm is a part should be defined with reference to its processes and machinery, not final products; the criterion is whether in the not so very long run, other firms could offer adequate substitute products.' (E. Brunner, 'Competition and the Theory of the Firm', *Economia Internazionale*, August 1952, p .12.)

ORGANIZATION OF THE INDUSTRY

The Products Involved. The complex market situation in which titanium products are sold may now be considered in the light of the above tentative guides to market results. The basic raw materials, ilmenite, rutile and titanium slag,[8] are converted into commercially pure oxides and chlorides. Titanium dioxide is precipitated as pure or extended titanium pigment and enters the paints, plastics, floor coverings, coated fabrics, textiles, rubber, paper, inks, cosmetics and other industries. Other forms of the oxide are used in the manufacture of titanium powder (for master alloys); abrasives and cutting tools (as cemented carbides); jewelry, optics and dielectrics (as fused crystal); ceramic glazes, welding rod coatings and miscellaneous chemicals.

The chloride is used primarily as a raw material in the production of primary titanium metal, and also as artificial smoke and as a waterproofing agent. The basic raw materials, the pure oxide, and a number of manufactured alloys also find metallurgical applications in the production of steel, aluminum and nontitanium — base ferroalloys. (For the past two decades, titanium pigments have been the most important end product, accounting for from 90 to 95 per cent by weight of the estimated consumption of titanium.)

The development of new forms of the product over the past three decades has provided additional substitution possibilities to disturb the 'balance' of a variety of markets for industrial commodities. Technical superiority, rather than price, has conditioned the adaptation of some of the newer forms, e.g., the use of titanium metal in preference to steel or aluminum in military aircraft.

Definition of the Industry. Substitutability of products in the short run may be said to provide an umbrella under which the titanium industry can in general be defined. A certain amount of primary titanium metal (titanium sponge) and titanium metal scrap, for instance, is presently sold for use in iron and steel making, powder metallurgy, pyrotechnics, and other purposes, and may be said to compete rather closely with ferrotitanium, titanium powder and metallurgical or alloying compounds made from manufactured titanium dioxide, ilmenite or rutile.

Further reasons for classification of titanium as an 'industry' can

[8] Commercial grades of ilmenite concentrates vary from 45 to 60 per cent titanium dioxide and rutile concentrates contain about 94 per cent TiO_2. In some instances the ilmenite and iron oxide minerals occur as discrete grains so that a substantially complete ore dressing separation of the two is possible. In other cases the minerals cannot be separated by any degree of grinding. It is then necessary to employ a chemical or pyrometallurgical process in which the oxide is recovered as a titaniferous slag.

be found in such factors as the common raw materials used in the manufacture of many products; the production of these in the same firms (and in some cases within the same division of a firm); the frequent reassignment of technical and managerial personnel to different titanium products; and the character of clientele relations with government agencies, including reporting of statistics, technical assistance and wartime controls.

The industry can in this sense be located in the fifty American and fifty foreign firms producing ilmenite, rutile and titanium slag (ores and concentrates branch); ferrotitanium and other alloying and metallurgical products, and titanium carbide (alloys and carbide branch); pure and extended titanium pigments (pigment branch); titanium sponge and high-purity ductile titanium metal (primary metal branch); titanium and titanium alloy ingot and mill products, and finished metal products (fabrication branch). Firms in these five branches also market compounds for production of welding rods, ceramic products and other specialized uses.

The industry structure results both from a consolidation of independent producers and the development of new products within the various departments of a small number of large integrated firms. The history of the pigment branch of the industry shows a particularly large number of mergers. Production is concentrated in multi-product firms, which frequently join in ventures in which they have a common interest, forming a new company for this purpose. Vertical integration has gone quite far in this industry: of the thirteen domestic companies with facilities for production of primary titanium metal on a pilot or commercial scale, both directly and through subsidiaries and affiliates, three produce titanium minerals and three produce mill products. Two domestic producers, and one foreign producer of titanium sponge also manufacture titanium pigments. The fabrication branch, which currently exhibits the greatest growth potential, is dominated by four semi-fabricators. The two largest semi-fabricators are affiliated with the two largest domestic producers of ores and concentrates and of pigments, one of which is also the largest producer of alloys.

The largest producers are not primarily concerned with titanium products. E. I. DuPont, American Cyanamid and Glidden derive less than 5 per cent of their total sales revenue from titanium; and DuPont must prorate a part of this income with the other owner of a subsidiary. The National Lead Co., selling ferrotitanium, titanium pigments and (through a partially owned subsidiary) semifabricated titanium metal, receives from 25 to 30 per cent of its total sales revenue from these sources.

Number and Relative Size of Producers. Market shares in the pigment branch for a number of recent years are shown in Table I.

TABLE I

MARKET SHARES IN THE PIGMENT BRANCH OF THE TITANIUM INDUSTRY, 1943, 1952 AND 1955 (PER CENT OF SHIPMENTS, GROSS WEIGHT)

	1943		1952	1955[1]
	Extended	*Pure*	*Total*[2]	*Total*[2]
DuPont	23.5	45.1	10-20	10-20
National Lead	76.5	46.6	70-100	50-100
Virginia Chemical[3]	—	8.3	*	*
Glidden[4]	*	*	1-10	1-10
American Cyanamid	*	*	1-10	20-30
New Jersey Zinc	*	*	*	1-10
Total	100.0	100.0	100	100

[1] Assumes that sales of the first three firms remain unchanged at 1952 levels, and that sales of American Cyanamid Co. increase by 100,000 short tons per year, less the 1952 output of a plant to be turned over to New Jersey Zinc Co. after a new plant commences production.

[2] Excludes pigments used by National Lead and DuPont within their own plants — i.e., for production of paints, plastics, etc.

[3] Plant purchased by American Cyanamid Co. in 1944.

[4] Purchased National Lead's interest in American Zirconium Corp. in 1944.

SOURCE: Civil No. 26-258, District Court of the United States for the Southern District of New York, October 11th, 1945 (63 Fed. Supp. 513); and U.S. Bureau of Mines.

Titanium alloys and carbide are produced by fifteen companies in the United States. Only two of these, National Lead and the Vanadium Corp. of America, produce over 1000 short tons of products per year. Nine manufacture ferroalloys;[4] three are in the light metals industry; and four produce titanium carbide for use in abrasives and cutting tools.

In the rapidly expanding primary metal branch of the industry, two companies accounted for virtually all of the domestic production of titanium sponge during 1953. These were E. I. DuPont and the Titanium Metals Corp. of America (T.M.C.A.), a subsidiary of the National Lead Co. and Allegheny Ludlum Steel Corp. By the end of 1955, the output of Cramet, Inc., a subsidiary of the Crane Co., should equal the planned production of these two firms combined. A fourth producer will be the Dow Chemical Co.

It would be impossible to say how many manufacturing companies have sufficient experience with titanium metal to be classed as fabricators. With increasing output, titanium fabrication and use could easily spread to 2000 companies in the next four years. Four semi-fabricators account for virtually all of the domestically

[4] The principal forms are high-, medium-, and low-carbon ferrotitanium, nickel-titanium, silicon-titanium and manganese-titanium. All are employed as metallurgical additives.

produced titanium and titanium alloy ingot and mill products. One is affiliated with National Lead (T.M.C.A.); one with DuPont (Rem-Cru Titanium, Inc., owned by Remington Arms Co. and Crucible Steel Corp.); one is a joint venture by two non-producers of titanium sponge (Mallory-Sharon Titanium Corp.); and one is the Republic Steel Corp.

Of the six domestic producers of ores and concentrates, two firms, National Lead Co. and E. I. DuPont, account for approximately 85 per cent of the annual domestic mine production of ilmenite and more than 90 per cent of the rutile. Between 30 and 40 foreign firms produce titanium minerals; but only six of these have an annual capacity of more than 10,000 metric tons of ilmenite and/or rutile concentrates.

THE CONDITIONS OF ENTRY

With the possible exception of the fabrication branch, the industry does not show any real prospect of entry by a large number of firms. The processes for producing titanium alloys for metallugrical use are relatively simple, the basic patents have expired; and entry into this branch of the industry does not present severe difficulties. But the market for alloys is limited to a few makers of specialty steels, which are capable of manufacturing their own substitutes for the product.

The American Cyanamid Co. is spending $14,000,000 on the construction of a plant which will increase its share of the pigment branch of the industry from 1-10 per cent to 20-30 per cent of the total (while simultaneously selling one of its older plants). Patents covering numerous phases of ore processing and pigment manufacture are available on a non-exclusive license basis, as a result of antitrust proceedings initiated in 1944 against two major domestic pigment manufacturers.[8] Entry of new firms into the pigment branch, which is continuing to date, suggests that the change in patent licensing policy introduced at that time has been a significant influence in easing the barriers to entry. During the Korean War expansion period, all government aid to this branch of the industry, in the form of accelerated amortization certificates, went to the new entrants: the American Cyanamid Co., the Glidden Co., and the New Jersey Zinc Co.

Entry into the primary metal branch of the industry requires both capital and technical know-how in large amounts. DuPont's

[8] Two hundred and fifty-nine patents and fifty patent applications belonging to DuPont and National Lead, and forty-six other patents and applications are covered. (Final Decree: Civil No. 26-258, loc. cit.)

facilities, with a capacity of about 10 short tons of titanium sponge per day, cost $15,000,000 to erect. The Crane Co. is spending $40,000,000 in the construction of a single non-integrated plant. The two largest producers of titanium sponge in 1954, DuPont and the Titanium Metals Corp. of America, report expenditures of over $1,000,000 per year on process research and market development alone.

The basic process for producing titanium metal, by reducing titanium tetrachloride with magnesium in an inert atmosphere, was patented in Germany by Dr. Wilhelm Kroll in 1938, and in the U.S. in 1940. (Other halides and metallic reducing agents — such as calcium — have also been adapted successfully to the same process.) The patents were assigned to Siemens & Halske, A.G., a German corporation, and vested in the Office of Alien Property, U.S. Department of Justice, in 1943 and 1948 under authority of the Trading with the Enemy Act. Contract rights under the American patent provide for equal sharing by Dr. Kroll and the Attorney General of the royalties at mutually agreeable rates.[6]

Entry into this branch of the industry is further conditioned by the policy of the General Services Administration (G.S.A.) in issuing expansion contracts to producers of titanium sponge. Under the three contracts concluded with the current producers, a government loan, averaging slightly less than $4200 per annual ton of capacity, was made to each producer.[7] Repayment can be made in specified amounts per unit of production or by payments to the Government in the form of products, which amounts to a guaranteed purchase up to the amount of the government investment.

The General Services Administration's contract negotiators have expressed an intention to equalize as much as possible the shares of the industry going to any one primary titanium metal producer. In December 1953 it was stated unofficially that future contracts would be roughly 3600 annual short tons per producer. However, it is not at all clear that this policy will be followed if it means granting unduly favorable concessions to high-cost producers. The diver-

[6] Recent licensing agreements have provided for graduated per annum royalties — 5 per cent of the gross sales price of the first 50,000 pounds of titanium sponge; 3 per cent, for the next 50,000 pounds; and 1 per cent, on all in excess of 100,000 pounds. This royalty is payable on all sponge, powder, ingot and fabricated products, whether used intra-company or sold. It is reported that DuPont has negotiated a separate agreement with Dr. Kroll; but the text of this has not been made public.

[7] i.e., to T.M.C.A., DuPont and Cramet. Because of its previous anti-trust history, DuPont has consistently refused to contract for more than 2700 short tons per year. Seventeen other firms are currently negotiating for titanium sponge production contracts; but it cannot be ascertained how many of these are seriously interested. Under an agreement with the Dow Chemical Co., G.S.A. may purchase up to 2 million pounds of sponge metal by July 1956 if the company does not find other markets. A similar agreement with the Union Carbide Corp. has been announced.

gence between good intentions and actual results may be seen in the contracts negotiated during the first and second rounds of expansion in the primary aluminum industry (i.e., from 1950 to 1953). Prior to each round of negotiations, it was announced by G.S.A. that contracts would be given to new entrants in preference to the established firms. No new contractor would agree to come in for less than 1½ cents per pound above the market price, to be guaranteed until facilities were amortized. Satisfactory contracts were eventually awarded to the Anaconda Copper Co. and the Harvey Machine Co.; but because of a drastic reduction in appropriations to the Bonneville Power Administration, it is doubtful whether Harvey will be able to begin production until Congress acts.

MARKET BEHAVIOR AND STRATEGY

The industrial importance of the titanium minerals has increased more rapidly over the past three decades than that of any other group of minerals excepting uranium. Since their utilization on a relatively large scale is new, considerable experimentation and development is still going on, with the result that the consumption pattern is far from stable.

Ores and Concentrates. All but three of the domestic producing mines are owned by major users of these minerals or their subsidiaries. None of the large domestic producers is in the business of selling titanium ores and concentrates. A ten-year purchase agreement between National Lead and DuPont expired in October 1952. Under this agreement, arranged by the Office of Production Management in 1941, National Lead installed additional facilities in its ilmenite mine at Tahawus, N.Y., and allocated a share to DuPont, proportionate to the expansion in production facilities. The latter paid its share of capital costs, plus the cost of extraction, treatment and transportation of its share (25 per cent) of the ore. The Defense Plant Corp. advanced over $3,000,000 in government funds to build a railroad to the property.

An iron slag is sold directly by the Quebec Iron and Titanium Corp., at Sorel, Canada. Imported materials are sold by direct bidding on individual lots (except for those produced by foreign subsidiaries of domestic consumers). The price reflects, in general, the per cent of titanium dioxide contained in the concentrated ores; but the Sorel slag, a by-product of pig iron manufacture, sells at a considerable discount.

Alloys. The demand for medium and high carbon ferrotitanium (produced in small lots in electric furnaces from ilmenite, rutile and steel scrap) is closely correlated with sales of steel. The demand for

the low-carbon grade, used chiefly in the production of stainless steels, has increased at a relatively greater rate. The principal ingredients of this material, produced in the same manner as the medium and high carbon grades, are aluminum, rutile, coal and coke. There are about 100 customers for ferroalloys; and the largest producer, National Lead, reports that ten of them take roughly 50 per cent of the product.

The Titanium Alloy Manufacturing Co. (acquired by National Lead in 1948) has been producing ferroalloys since before World War I. By its own admission it is often the price leader, but apparently it follows no formula in pricing its metallurgical products.[8] These alloy products are sold, regardless of quantity, on a delivered price basis east of the Mississippi river and north of Baltimore. The Vanadium Corp. of America allows freight on quantities over 100 pounds, provided that the freight charge does not exceed the rate to St. Louis, as do the other sellers.

If, as indicated above, the pricing of these alloys is influenced by the possibility of countervailing power[9] arising in the steel industry, then this policy must be deemed a success. The Titanium Alloy Manufacturing Co. first started producing ferrotitanium in 1906. In 1952, only two steelmakers, Republic Steel Corp. and Universal-Cyclops Steel Corp., reported consumption of manufactured titanium dioxide, ilmenite and rutile for manufacture of alloys or as slag-making additives.

Pigments. There are no universally accepted grades of pigments, incorporating such factors as specific gravity, hiding power, tinting strength, particle size, chemical inactivity, refractive index, etc., although in all these respects titanium dioxide is superior to other white pigments. The earliest producers recognized that precipitation of pure and extended titanium pigments on a commercial scale was one of the most precise chemical operations heretofore attempted. Technical staffs of a high order were required to lay out and control the interrelated processes. Large sums were expended on research for the purpose of improving the quality of the product and developing new grades and uses. The development of rutile-type pigments at about the same time (1941) by both of the major producers, and their

[8] 'We don't forecast cost or sales,' the Chief of the Titanium Alloy Manufacturing Division remarked, 'because what a material costs us doesn't necessarily affect our selling price at all. We have taken losses because of raw material price changes – but what we lose on the swings we make up on the merry-go-round. We have no formula for pricing. A sales price is what a willing seller and a willing buyer agree upon. It has nothing to do with costs. We never feel guilty about our prices. If we take a loss, we might have a good reason, such as a development proposition.'

[9] In simplest terms, the ability to prevent exploitation by manufacturing the product or finding substitutes for it.

displacement of the anatase types has resulted in a marked improvement of specifications.

The technical superiority of the product over the lead and zinc pigments, and the advantage to producers of stable ilmenite prices (in contrast with the widely fluctuating prices of lead and zinc) have contributed to the rapid growth rate in the titanium pigment industry. The production of titanium pigments, negligible in 1920, is now almost 50 per cent greater than that of white lead, zinc oxide and lithopone combined.

Producers of titanium pigments all market paints containing the product, and in addition sell pigments to paint manufacturers. They stated that the price-elasticity of demand for titanium pigments is extremely low within wide ranges (i.e., that there appears to be a considerable gap in the chain of substitutes for the commodity), reflecting the current state of 'balance' in the market. Sales forecasts are compiled at DuPont from salesmens' reports on the assumption of a uniform price.

Between 80 and 90 per cent of production costs of pigment are variable. DuPont officials stated that average costs are estimated for at least four different levels of plant capacity. Such estimates are linked with sales forecasts to establish the most profitable level of output. Executives of National Lead stated that for their pigment plants there is only one technically feasible 'capacity' output. Expansion of output in these plants, they alleged, is accomplished by the addition of new plant and equipment; and contraction, by shutting down the entire plant at one time.

Car-lot pigment prices are f.o.b. factories in all cases, and identical for all producers. National Lead, which maintains 26 warehouses throughout the country, allows a slight concession by pricing lots up to 20 tons (i.e., car-load) f.o.b. factories or warehouses. Prior to World War II, the international industry represented a complex maze of cartel agreements.[10]

[10] By 1930 National Lead had purchased a controlling interest in the Titanium Pigment Co., the only domestic producer, and the Titan Co., A/S in Norway. In Germany, an agreement between National Lead and I. G. Farben resulted in the organization of Titangesellschaft, m.b.H., which built a titanium pigment plant at Leverkusen in 1928. This plant was acquired by National Lead in 1952. A similar agreement in 1933, with Imperial Chemical Industries, Ltd., created British Titan Products Co., Ltd., which constructed a plant at Billingham, England. Canadian, Japanese and French affiliates were also added to this group. Each of the companies had a capital tie-up with National Lead, was assigned a marketing territory in some portion of the world, and was licensed to use patents controlled by the parent company. The Titanium Pigment Co. thus acquired the North American market; British Titan obtained the Commonwealth and Empire (with the exception of Canada); and Titangesellschaft was allotted the balance of Europe and Asia. An agreement in 1920, renewed at frequent intervals as new firms entered the cartel, provided that each new company was to be given territory in which it would have the exclusive right to manufacture and sell titanium pigments and compounds.

Since 1947 American firms have been enjoined by a court decree from entering into exclusive patent licensing and marketing agreements. The record of this litigation is extremely lengthy: in its statement of complaints the Government attacked the method employed by the two pigment cartels to control the use and development of patents, alleging that this led to a direct restraint on trade by making it impossible for new firms to compete with them on equal terms. The Government asked for divestiture by National Lead and the Titan Co. of their financial interests in all foreign concerns. Divestiture proceedings were successful in the case of British Titan Products and Titan Kōgyo, a Japanese subsidiary; but National Lead was allowed to increase its shares in the Canadian and German affiliates to 100 per cent. (Civil No. 26-258, loc. cit.)

The degree of market power exerted by the major producers in some areas of the world, however, remains fairly strong. The history of the Indian firm, Travancore Titanium Products, Ltd., from October 1st, 1951, when it commenced production until June 30th, 1952, when operations were suspended for lack of a market, is of interest in this connection. The factory produced from 200 to 386 long tons per month; but it was not able to sell even 500 tons of pigment during that nine-month period. 'Radical reduction of the company's price failed to overcome its vulnerability even in the domestic market, as off-shore suppliers promptly retaliated with prices often below landed cost of their products in India.' (From a statement by A. Bowman, Managing Director, Travancore Titanium Products, Ltd.) The plant was reopened on January 1st, 1954, after the Government of India agreed to grant tariff protection to titanium dioxide, and after British Titan Products, a major stock-holder and technical adviser to the firm, agreed to buy all production not sold on the Indian market. The Government of India has recommended that its Industrial Finance Corporation lend the company Rs 1,500,000 ($316,500).

Primary Titanium Metal. Since 1948 the outstanding characteristic of the market for titanium sponge has been an amazing series of technical improvements, with emphasis on improving the Kroll production process and co-operation with fabricators in developing

A second group emerged in the 'thirties, including two French and one Italian companies. Its American affiliate was the Commercial Pigments Co., which was ultimately absorbed by DuPont in 1943. The American Zirconium Corp. commenced operations in 1934 under a license agreement with DuPont, which compelled the company to limit production to 3000 short tons per year and pay a royalty of 2 per cent on all pigments shipped. The company was successful three years later in having its quota raised to 6000 tons. In 1941, the agreement was amended once more to permit the production of 9000 short tons per year, and additional equipment was installed within the year to implement the new agreement.

techniques for melting, rolling, forging, welding and forming the metal. Price-cost relations in the marketing of titanium sponge are obscured by large expenditures in private industry on research and development,[11] various types of financial assistance from the Federal Government,[12] and purchase contracts with the Government which are calculated to ensure amortization of investments in plant and equipment. Development of this branch would have been a great deal slower in the absence of such a program of outright subsidies and market guarantees.

As measured by 1953 sales of titanium sponge on the open market, DuPont was technically a 'monopolist', although such a conclusion is obviously untenable in the light of our 'processes and machinery' definition of an industry. The effect of this situation on DuPont's price policy for the product was not clear: on the one hand, officials denied that policy was affected by the threat of entry by new firms; on the other, they refused to accept additional commitments from G.S.A. until new entrants had received similar contracts.

The Bureau of Mines' research and development plant at Boulder City, Nevada, might be used as a yardstick for the establishment of price-cost relations in the marketing of titanium sponge.[13] Estimated operating costs of this plant, under assumed conditions of capacity production and assumed reasonable prices (based on estimated costs of production) for raw materials, indicate that high-quality metal sponge can be produced by the Kroll process at a 'direct' (i.e., variable) cost of $1.68 per pound. The process would appear desirable to potential new entrants because of free access to patents and the large body of technical information made available through the operation of the Bureau's plant. The facilities have been visited by representatives of 25 companies for periods ranging from two days to four or five months. They were operated by T.M.C.A. for over a year for the purpose of obtaining production experience.

Fabricated Products. Possibly three-fourths of the price of titanium metal to the end user represents value added by melting and semi-

[11] The DuPont Co. reported a sizeable loss per pound of titanium sponge sold, because of its policy of allocating research and other overhead costs on the basis of each product's annual sales value, rather than allowing other products to bear part of these costs.

[12] Accelerated amortization has been allowed on all sponge production facilities. Under its latest titanium program, the Office of Defense Mobilization is attempting to promote technological progress by providing $25,000,000 to assist pilot plant tests on new processes which in the opinion of a technical committee appear feasible but are not being developed as rapidly as possible. A grant of $564,000 was made to Horizons Titanium Corp. to erect and operate for one year a pilot plant to study a new process for making titanium metal. If the tests are successful and Horizons later uses the method to produce the metal, or assigns production rights to another company, the cost to the Government will be refunded.

[13] In August 1954, the Secretary of the Interior announced that an attempt would be made to sell this plant to private industry.

fabrication. Each of the major producers of semi-fabricated titanium and titanium alloy metal establishes prices on a different basis. Two companies have published price lists. A list of base prices was published by T.M.C.A. on December 1st, 1950. Announcement of a reduction in charges for extras in February 1954, averaging about 12 per cent, was followed within a few days by a new development in Rem-Cru's price policy. Rem-Cru's first price list (February 1954) established identical base prices for bars, billets, sheets and plates; but the charges for extras were assessed on a different basis from those of T.M.C.A.; and strip, wire shapes and other products were not included in the list. Rem-Cru officials stated that the new policy would in effect cut prices up to 14 per cent and represented the third price reduction which Rem-Cru had made in its products.[14]

On April 27th, 1954, T.M.C.A. made a further adjustment in titanium strip and wire extras. On strip, the average reduction was about 12 per cent, or roughly $2.75 per pound. This reduction has not been publicly matched.

The use pattern for semi-fabricated titanium metal remains in the development stage. The price is now sufficiently low to ensure a market for titanium in a variety of military and civilian applications; but specific designing for titanium is reported to be the exception rather than the general rule. T.M.C.A. sells to 250 customers; but it does 90 per cent of its business with 20 companies.

Marketing methods for fabricated titanium products are similar to those for titanium sponge, in the emphasis on fundamental research and on close co-operation between producers and their customers. This is evidenced by the large volume of handbook and other information published by producers, which frequently contains data compiled in the laboratories of customers and other outside interest groups. One seller reports spending $300,000 in two years on technical assistance to forging companies. During the same period, this company co-operated with customers in the development of new alloys, utilization of scrap and other technical problems.

The pattern is much influenced by allocation of supplies to military users. Defense ratings are established by the Department of Defense for all users of titanium mill products; and deliveries are scheduled by means of monthly directives, freezing schedules to each consuming plant. Under an order of May 19th, 1954, producers are authorized to release 10 per cent of monthly output to civilian users. This action was taken 'to permit the industry to expand titanium

[14] The dates for these reductions were not given, although they are presumably known to large buyers of titanium mill products. T.M.C.A.'s price list was first revised in August 1953. Officials stated that cost sheets are reviewed every six months for possible changes in the price list.

output and development along normal lines'. In 1953, DuPont allocated its output of sponge metal to the three major semi-fabricators on the basis of their 1952 purchases of the material. Using this criterion for rationing a product in short supply, DuPont managed to send the bulk of its sponge production to its own subsidiary. Although the Business and Defense Services Administration, Department of Commerce, was authorized to allocate the supply of titanium sponge, it did not choose to exercise this power.

Summary. A classification of titanium products on the bases by which prices are quoted is indicated. The delivered prices for alloys are identical in most steel-producing areas, and price leadership follows a clearly defined pattern approximating that of case (1) (p. 222 *supra*). Quoted prices for titanium pigments are identical; but delivered prices depend upon size of the order, which determines in some cases whether transportation shall be charged from plants or warehouses. Leadership in the pigment branch is probably of the case (3) variety. A third group includes those products in which each firm establishes price policy on a different basis (ingot and mill products). In the fabrication branch the emergent pattern of price leadership will probably assume the characteristics of case (4); and although T.M.C.A. has been the initiator of price reductions during the current development period,[15] it is not clear which firm will eventually assume leadership.

The above classification has the effect of ranking the different branches by age, as the alloys and carbide branch is the oldest.[16] Average-cost pricing is evident in the older branches of the industry, although a number of exceptions are noticeable. Price-cost relations in the newer branches are obscured by current expenditures on research and market development, which are partially subsidized by the Federal Government.

The increased supply of titanium and titanium alloy products brought forth by military demand has undoubtedly encouraged experimentation for other uses. It is difficult to foresee where these developments will lead, even assuming a high level of activity in the economy as a whole. A basic determinant of the size of this industry will be the price of titanium sponge, as numerous steel producers will be able to convert much of their rolling and fabricating capacity to the industry if sufficient demand is developed.

[15] Here is an interesting example of a firm—in this case National Lead—providing price leadership in several branches of its product line: alloys, fabricated titanium metal and possibly pigments.

[16] Ores and concentrates cannot be classified in exactly these terms, because of the high degree of vertical integration in the industry, the long-term contracts involved in some purchases, and the relatively unorganized state of the market.

PERFORMANCE

Our method of market classification makes it necessary to try a variety of *ad hoc* rules rather than an assumed ideal pattern as a standard of performance. The basic check is whether current results have caused the maximum increase in values of goods and services produced, in proportion to human effort.[17] It is necessary to supplement the available findings in this respect by determining whether effective alternatives exist in the relevant market, a condition which must be assessed in extremely broad terms, whether or not the alternative available from any source happens to be within the conventional boundaries of this or that industry.[18] It would be of value also to consider whether *freedom to create such alternatives* is unimpaired; whether artificial barriers to entry exist.[19] And finally, there is the normative test: whether the situation can be improved by intervention by the government.[20]

Value of Output. Price behavior and price trends form virtually the sole basis for applying the basic check on performance. The price of ilmenite, the raw material used primarily in the production of manufactured titanium dioxide pigment, remained fairly constant during the decade of the 'thirties, rising from $8.49-$9.82 per short ton in 1928 to $10-$12 in 1939. Because of greatly increased demand and lack of shipments from India, by far the most important source prior to 1942, ilmenite prices rose by roughly 150 per cent between 1939 and 1942. They remained on this plateau until 1947, in spite of the resumption of imports from India in 1944 and the opening of new mines in New York and Florida, which were allowed rapid amortization as defense plants. Prices are today 65-75 per cent higher than prewar. Since 1948, the price of rutile ore, the major

[17] i.e., 'continued growth in the efficiency with which the factors of production are organized and energized: the efficiency of production in real terms'. (J. M. Clark, 'The Orientation of Antitrust Policy', *American Economic Review Supp.*, May 1950, p. 95.)

[18] 'New and better products and services may create limited and temporary exclusive advantages . . . such limited advantages are the root and fruit of effective competition (since) they increase the number of alternatives available to customers.' (B. Smith, 'Effective Competition: Hypothesis for Modernizing the Antitrust Laws', *N.Y.U. Law Review*, July 1951, pp. 414-15.)

[19] This test is emphasized by Corwin Edwards. (C. D. Edwards, *Maintaining Competition*, 1949, *passim.*, esp. pp. 9-10.)

[20] 'An industry may be judged to be workably competitive when . . . there is no clearly indicated change that can be effected through public policy measures that would result in greater social gains than social losses.' (J. W. Markham, 'The Concept of Workable Competition', *American Economic Review*, June 1950.) Professor Markham reviews the contributions of Clark, Stigler and Edwards in this field, criticizes them on the grounds that they 'neglect the dynamic forces that shape an industry's development', and concludes that tests of performance cannot be separated from the value judgments of the policy-minded investigator. It is not clear to what extent Markham would substitute these value judgments for more 'objective' standards. A careful review of structure and performance, and of the forces shaping them, i.e., an 'historically oriented' rather than a 'policy oriented' report, might be a more desirable medium in which to incorporate the ingredients of an industrial situation. But this is perhaps a matter of taste.

source of manufactured titanium tetrachloride, has been lower than at any time since 1928. This probably reflects the increased supply from Australia, as mines were rapidly developed there during World War II.

Prices for ferrotitanium, as for other end products containing titanium, were relatively inflexible before World War II, and are today approximately the same as in the late 'twenties. No great disparity between raw material and product price movements is apparent. Prices quoted in the United States for titanium pigments from 1928 to 1939 show a gradual downward trend. Pigment prices today, approximately what they were in 1931, do not reflect the increase in quoted ilmenite prices.

In 1946, a major producer of titanium metal reported a loss of $4 per pound at the ceiling price of $5.50 and requested approval for a price of $15 per pound to cover manufacturing cost, overhead and profit. A price increase of the magnitude requested did not materialize, as improved processes and expanded output soon reduced unit costs to a level compatible with the $5 price for titanium sponge, which prevailed until April 1954.[11]

It is not possible to derive an index of selling prices for titanium and titanium alloy mill products. Base prices quoted by T.M.C.A have remained unchanged since January 1950, while charges for extras have dropped by immeasurable steps.

Competition Among Products. With reference to the existence of effective alternatives, the relatively high degree of concentration in the production of titanium minerals is not a cause for alarm. Since 1942, when National Lead opened its large mine at Tahawus, N.Y., the two largest producers have accounted for the greater part of the ilmenite and rutile output in the United States. A mine at Caldwell, N.C., operated by the Glidden Co., closed in 1952, further increasing the importance of National Lead and DuPont. Crude titanium minerals and basic slag are currently on the free list of our tariff schedules. As long as titanium minerals continue to enter this country free of tariffs, there is equal opportunity for all producers to make use of cheap foreign sources of supply.

The end products of the titanium 'industry' today are virtually non-competitive, except insofar as they compete with each other. In the long run, of course, it is apparent that the markets for alloying

[11] On April 1st, 1954, the price of titanium sponge was lowered from $5 to $4.72 and $4.46 per pound, although specifications for the product were changed at the same time, perhaps to conceal the price cut. Government purchase contracts will support the price at from $4 to $5 per pound until the plants built under the current expansion program are completely amortized. Surplus sponge is sold to G.S.A. under a revolving fund program established to maintain capacity operation of facilities during the development of military applications.

ingredients, structural metals and paint pigments have been affected by the development of new forms of the product. The change has been that of an alteration of the product lines of established firms, albeit sometimes the absorption of an independent producer, followed by a large expansion in output and entry by other widely diversified businesses. As entry has taken place in each of the five branches of the industry, prior to achievement of a new 'balance', it is difficult to see how this second test has been violated.

Competition Among Producers. As for the third test, we have gone over this ground in the earlier discussion of conditions of entry. In its present stage of development, titanium metal technology is primitive in comparison with that of the other large tonnage structural metals. It appears quite likely that new alloys with properties superior to and different from those now known will be developed and that the uses for titanium metal will thus be extended. Titanium has some inherent properties which indicate that the production of this metal will always require complex metallurgical techniques. It cannot be exposed to the atmosphere at the temperatures required for its reduction, because it picks up oxygen and nitrogen that embrittle the metal; and either vacuum or inert gas metallurgy techniques are necessary. It is difficult to conceive of any process where this would not be true.

The present applications of the Kroll process are somewhat unsatisfactory by virtue of the limitation on the size of the batches produced, in contrast with the continuous electrolytic methods used in the production of the other light metals. The metal produced by the Kroll process must be further refined to produce ductile sponge. The sponge also requires a relatively complex melting technique, as there is no known refractory material which will hold molten titanium. Several large companies have developed electrolytic production processes in the laboratory and in some cases in small pilot units. These companies will not divulge details of their processes except as required for government assistance. Competition in this respect is the subject of much comment in the trade press. The fact that substantial results have not yet been made public does not appear to have caused any reduction in research outlays to date, as the rewards for success are high. With technology in such a state of flux, *government subsidies for private research programs can continue to exert a powerful influence on the distribution of know-how in the primary metal branch of the industry.*

Normative Checks. The final test of performance yields fairly clear results in the alloys and carbide and the pigment branches. It could be argued that public intervention in the market for alloys and

carbides, directed toward equalization of costs and revenues at the margin, would result in a more rational allocation of factors of production. The history of this branch of the industry suggests that the distortion has never been very great over a very long period of time.

Public intervention has, however, been an outstanding success in the pigment branch; and it is worth repeating that the current interest in titanium metal was to a large extent an outgrowth of the Bureau of Mines' success in producing ductile titanium; continuous research by the Bureau of Ordnance, the Bureau of Ships and other government agencies; and the distribution of free samples of the metal and of research abstracts and other information. The Defense Materials Procurement Agency (until its termination) and the General Services Administration have negotiated purchase contracts with potential entrants into the industry and assumed a large share of the banking and risk-taking function for these firms.

The range of public policy alternatives in encouraging an increase in titanium metal production was circumscribed by the Defense Production Act of 1950, which did not authorize the defense agencies to enter into 'management contracts' with private firms, under which the latter would build and operate plants with the entire output as well as the plants remaining in the possession of the Government. Examination of the available evidence, and the history of the synthetic rubber, aviation gasoline and magnesium industries which were influenced in this way during World War II, reveals no decided advantages of the management contract or other proposed devices for increasing the production of titanium over the method actually employed. The G.S.A. program may attract more firms into the industry than management contracts would have, although the precise outcome depends upon how many firms accept contracts, the provisions of these contracts, and whether new processes of titanium metal production and fabrication replace the present ones.

Both the primary metal and fabrication branches have been influenced in their development by the large volume of research which is currently being conducted as a part of the regular operations of a number of branches of government, or under contract with these agencies. Mobilization of public research in the public interest is facilitated by the Patent Review Board, which is charged with the task of laying down a uniform policy with regard to government patents in the numerous organizations involved in research and development work in science and technology. The assignment of government patents and their use by industry should, however, be supervised on a case-by-case basis by the Anti-Trust Division of the Department of Justice. Denial of assignment or of a license by the

Anti-Trust Division would clear the government agency which had developed the patent from further involvement in the case.

The general principle upon which the Anti-Trust Division should define the public interest can be briefly stated. Assuming that workably competitive conditions exist in an industry, or can first be achieved by means of trust-busting, the results of government research should in all cases be introduced on a non-discriminatory basis.[11] In other cases, in which the patent might conceivably be withheld under this principle, it might later be used by the Anti-Trust Division as a bargaining weapon in obtaining a consent decree. In the present instance, government patents could be controlled, in outright bargaining over the price of titanium sponge, with a threat of further anti-trust action in case a more equitable price-cost relation is not established. The current price of $4.46-$4.72 is far in excess of the yardstick cost of approximately $2.25 achieved at Boulder City.

It would seem that the titanium industry typefies to a remarkable extent the structural attributes of producers' goods manufacturing industries in America. If so, the present study emphatically justifies our stressing the segmented, multi-product character of markets, oriented with respect to achievement of 'balance' among producers rather than 'equilibrium' in markets for individual products.

The fact that two branches of the titanium industry are currently supported largely by government demand, and have been the recipients of considerable financial assistance from various government agencies, has of course had important behavioristic consequences. The following are at least worthy of repetition: (1) Innovations have been introduced, in both an earlier period of the industry's history, characterized by cartelization, and in the current phase of significant government influence on entrepreneurial decisions. They have been vastly more numerous under the latter circumstances. (2) Anti-trust policies and recent mobilization programs have laid the ground for growth and further innovatory activity in the industry. This provides a basis for faith in the possibilities of the Federal Government as an agent for promoting competition. And it is not unduly optimistic to expect that, while individual case studies of other industries during these years of semi-mobilization may fail to supply the basis of a general theory, they will result in something other than a new 'lament of economics'.

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[11] This suggestion ignores the market situations, such as for atomic power, for which effective public utility-type controls will also have to be applied. It might be more relevant in markets for radioisotopes and other products of the atomic energy program and electronic devices developed in government laboratories, as well as for the sister metals titanium and zirconium.

THE U.K. COTTON INDUSTRY, 1937-54

by B. Vitkovitch

1954 was the first post-war year in which the cotton industry appears to have been free from abnormal influences. Until 1949, home demand was inflated by making good shortages incurred during the war and rationing, while deliveries overseas were high because of the comparative absence of competition. More normal trading conditions, particularly in export markets were rapidly returning during the first half of 1950 only to be forestalled by the Korean boom. Then followed the depression from November 1951 to September 1952. But by the fourth quarter of 1953, output had recovered, if only partially, from the low level reached in 1952 and since then has remained comparatively stable. The time would therefore seem opportune for a review of the industry's post-war development, and a comparison of the existing structure of demand with that in 1935-37.[1] This is the purpose of this article.

Section I is a general survey. It examines the trend in deliveries to the home and export markets and the part played by imports. Section II deals in more detail with the home market. Total deliveries are divided into four broad classes of fabric — apparel, household and furnishing, surgical dressings and fabric for industrial and other users — and post-war developments in demand are examined. Section III analyses the main changes in the distribution of U.K. exports by markets and the U.K. share in these markets.

This analysis brings out some disquieting features, particularly with regard to exports. In 1954, when the home market consumed about 92 per cent of its pre-war volume of woven goods, total exports were 60 per cent lower. The proportion of home woven goods delivered to the export trade declined from 51 per cent in 1935-37 to 29 per cent in 1954. Between these years the share held by the industry in international trade was more than halved. And the main reasons for this loss have not been, as they were in the inter-war years, competition from Japan and India and declining total imports in overseas markets, but competition from Western Europe and the U.S.A.[2] Moreover, the bulk of this competition took place in types of cloth that the industry is best fitted to produce.

[1] The three year average 1935-37 has been chosen to represent the pre-war position chiefly because detailed information for the home market is available for this period. The industry's exports varied little during these years but its share in international trade declined from 31 per cent in 1935 to 28.5 per cent in 1937.

[2] If the industry had maintained its competitive position with the U.S.A. and European exporters, two thirds of the loss of exports since 1935-37 would have been avoided.

Exports have been falling throughout 1954 and the present level of activity is being maintained by the home market. If there is no revival in exports and if the normal seasonal pattern of home market demand operates, a recession is inevitable in the second and third quarters of 1955.

In the final section, some of the reasons normally put forward for the industry's poor export performance are examined.

The cotton industry is defined to include those processes involved in the production of rayon, mixture and synthetic fabric as well as cotton fabric.[3] This broad delineation is justifiable because of flexibility on the supply side.[4] Concentration on cotton alone would underestimate the level of activity open to the industry.

I

The trend in output of the three main sections of the industry is given below. Two features of the industry's post-war development are apparent. Firstly, its inability to achieve the pre-war volume of output and second, the divergent growth of individual sections.

TABLE I

U.K. Cotton Industry: Production 1937-54

QUARTERLY AVERAGES

	Yarn	*Loom state cloth*	*Finished piece goods*
	Mn. lbs.	*Mn. sq. yd.*	*Mn. yd.*
1935-37	328	1070*	700*
1945	174	481	368
1948	240	635	492
1951	269	769	652
1952	193	595	508
1953	238	683	573
1954†	250	715	590

* Estimated. † Provisionally estimated.

Ignoring changes in the types of yarn and cloth produced which tend, in fact, to inflate estimates of the post-war production of the industry, the output of the spinning and finishing sections in 1945 was 53 per cent of their pre-war volume. The weaving section, more heavily concentrated during the war, was producing at only 45 per cent of its pre-war level. During the next three years, the production

[3] Production data as published in the *Cotton Board Statistical Review*. Yarn production figures include the production of *spun* rayon and synthetic staple but not the production of rayon and synthetic staple and filament.

[4] For instance, flexibility in spinning is higher between cotton and rayon staple than between Egyptian and American cotton.

of loom state and finished cloth kept roughly in step, showing an average annual increase of 11 per cent. But earlier recruitment campaigns in spinning together with the greater ability of this section to utilize unskilled labour, led to a more rapid recovery in yarn output which rose by 13 per cent.

After 1948, the rate of increase of the weaving and spinning sections fell considerably. Until 1952 this was not due to declining demand[5] — order books were never so full as in 1950 and 1951 — but to the inability of these sections to maintain recruitment at the previous rate.[6] The average annual increase in loom state cloth production declined to 7 per cent between 1948 and 1951, while that of yarn production fell even more drastically to 4 per cent per annum.

The production of finished piece goods, however, continued to increase at about 11 per cent per annum. By 1951, output had recovered to within 7 per cent of the pre-war level,[7] while yarn and loom state cloth production were still 18 per cent and 24 per cent below. The finishing section was able to operate at this comparatively high rate of activity partly by finishing a higher proportion of loom state cloth than was normal pre-war practice, and partly by processing foreign woven cloth, the imports of which increased considerably during the post-war years.

By 1954, the industry had made a substantial recovery from the 1952 depression but had not achieved the 1951 level of output. During 1953, when the bulk of the recovery occurred, production was limited by the difficulty of attracting back labour lost in the depression, but since March 1954, trade reports suggest that order books have been falling with only a temporary and not very significant improvement in September and October.[8] Low order books and not the labour situation is now the main obstacle to increased production and some spinning and weaving firms have announced their intention of granting extended holidays during the 1954 Christmas period.[9]

Details of the deliveries of woven goods which are directly or indirectly responsible for about 80 per cent of the employment of the

[5] Some spinning firms reported low order books in the second quarter of 1950 and stocks of yarn, particularly weft in the Egyptian section, were reported to be increasing. Cf. The annual report of the Combined Egyptian Mills in the *Financial Times*, December 22nd, 1950. But there was no fall in total yarn production.

[6] The average annual increase in the labour force between 1945 and 1948 was 12 per cent. Between 1948 and 1951 it was 4 per cent.

[7] The finishing section achieved its pre-war labour force during 1951. In that year the industry had surpassed the Working Party's most optimistic estimate of recruitment by 25 per cent.

[8] The trade reports referred to are the daily reports in the *Manchester Guardian* and Tattersall's weekly reviews.

[9] The main sections so far involved are the spinning and weaving of fine cotton and rayon staple.

industry are given in Table II.[10] Deliveries to export present no particular problem in computation[11] but deliveries to the home market have to be estimated and must be treated with reserve. The method of estimation employed is explained in the following section; here it is sufficient to note that these series indicate deliveries by converters,[12] either to makers up, wholesalers or retailers and do not necessarily represent ultimate consumption. Variation in stock and work in progress in the weaving, finishing and converting sections have, by definition, been excluded, but no allowance has been made for such movements beyond the converting stage.

TABLE II

U.K. Cotton Industry: Estimated Delivery of Woven Goods 1937-54

QUARTERLY AVERAGES — MILLION SQUARE YARDS

	Exports			Home Market		
	Total	*Home Woven*	*Foreign Woven*	*Total*	*Home Woven*	*Imported*
1935-37	546	543	3	553	527	26
1945	142	142	—	345	339	6
1948	249	213	36	392	372	20
1949 1st half ..	311	261	50	401	372	29
2nd half ..	277	219	58	446	407	39
1950 1st half ..	268	217	51	525	488	37
2nd half ..	293	245	48	525	491	34
1951 1st half ..	312	264	48	588	544	44
2nd half ..	282	229	53	506	457	49
1952 1st half ..	247	199	48	492	453	39
3rd quarter	203	169	34	399	364	35
4th quarter	242	204	38	451	431	20
1953 1st half ..	227	205	22	468	453	15
2nd half ..	252	229	23	490	469	21
1954 1st half ..	237	216	21	537	498	39
2nd half* ..	203	172	31	520	476	44

* Provisionally estimated.

During the early post-war years, government policy was directed to stimulating the industry's exports. Under the 'symbol' system, quarterly period allocations of yarn severely limited fabric supplies

[10] The bulk of the remaining 20 per cent is employed in producing yarn for delivery to customers in the U.K. other than weavers, for example the hosiery and electrical industries and the rest are concerned with producing yarn for direct export.

[11] About 10 per cent of total exports consist of made up fabric, which are given in the Trade Returns by number of articles, by value or by weight. The conversion to square yardage has therefore to be estimated. The figures of foreign woven piece goods exported have been kindly supplied by the Cotton Board.

[12] The converter is a specialized merchant. He purchases loom state cloth from the weaver, determines the style characteristics to be imparted to it and arranges for the actual processing to be done on commission, by finishers. The above figures of deliveries, however, include all converted cloth; that is, they include cloth converted by producers as well as by specialized merchants.

to the home market,[13] while price controls increased the incentive to export. As a result, home woven exports increased by 84 per cent between 1945 and the first half of 1949, while home woven deliveries to the home market increased by only 10 per cent. This rapid increase in the U.K.'s exports, however, was not sufficient to maintain the industry's position in international trade and the U.K. proportion declined from 27 per cent in 1946[14] to 23 per cent in the first half of 1949.

Between the first half of 1949 and the first half of 1950, the upward trend in U.K. exports was reversed. Exports of woven goods (including foreign woven) declined by 14 per cent. About one half of this loss was due to the imposition of import restrictions and requests for delayed deliveries consequent upon the deterioration in the balance of payments of importing countries;[15] and about one half to lack of competitive ability in expanding markets.[16]

In the face of declining exports, a seriously over-stocked position appeared inevitable. The abolition of the 'symbol' system in August 1949, however, considerably eased the situation and converters were able to divert supplies to the home market. In the year ending June 1950, the rate of home woven deliveries increased by 20 per cent over the first half of 1949. But during the first half of 1950, deliveries began to fall and there is evidence that the demand in the home market had been fully met.[17]

The rate of fabric production in the first half of 1950, however, showed no evidence of declining. With both export and home market demand falling, converters' stocks seemed certain to increase. And reports of unplanned stocks were not infrequent.[18]

[13] A short description of the operation of the system together with a detailed analysis of the end uses of cotton and waste yarns are given in a paper by A. C. Wild, Manchester Statistical Society, November 1950.

[14] The proportion in 1935-37 was 30 per cent. The trend in international trade and the shares held are given in Table X. U.K. exports include foreign woven cloth processed in this country.

[15] Particularly in South Africa, Canada and Australia and New Zealand where total imports declined. The U.K. share in Canada fell because of competition from the U.S.A., but was maintained in the other two markets. For the share of the U.K. in overseas markets see Table VI.

[16] The main markets were the Far East and the British Colonies. The loss was due to Japanese and Indian competition. International trade expanded by 9 per cent between the first half of 1949 and the first half of 1950. Japan and India increased their share from 21 per cent to 39 per cent. The U.K. share fell from 23 per cent to 17 per cent.

[17] This was particularly the case for the demand for apparel, household and furnishing fabric, deliveries of which declined in both the second and third quarters of 1950. The proportion of non-utility apparel cloth – which reflects the diversion of cloth from the export to the home market – was 34 per cent in the first half of 1949, 40 per cent in the second half, and 51 per cent in the first quarter of 1950. By the second and third quarters of 1950, it had fallen to 46 per cent and 42 per cent. It would appear that the bulk of the apparel deliveries were not being supported by increased personal consumption and were going into stock at the wholesale level.

[18] See for instance, Tattersall's weekly reviews and the *Draper's Record* between May and July 1950.

The outbreak of war in Korea in June postponed the readjustment of production that would otherwise have taken place. The Korean boom was primarily an export boom. Assuming that the relative rates of increase in exports and home market deliveries during the second half of 1950 and 1951 above those of the first half of 1950 represent a fair approximation of the strength of relative demand,[19] export demand rose by 28 million square yards[20] (or 10 per cent), while home market demand rose by 15 million square yards (or only 3 per cent).

In the subsequent depression, the decline in home market demand was absolutely — though not relatively — the greater. During the first three quarters of 1952, when deliveries were at their lowest, export demand appears to have declined at a rate of 36 million square yards (or 13 per cent) below the first half of 1950. Home demand declined by 64 million square yards (or 12 per cent).

Following the recovery in August 1952, trade reports suggest that both home and export demand increased sharply until the end of 1952: home demand tended to increase throughout 1953 and the first eight months of 1954, but the seasonal increase in the fourth quarter of that year was lower than normal;[21] and export demand,

TABLE III

U.K. Cotton Industry: Estimated Piece Goods Imports for Process and Re-export 1937-54

QUARTERLY AVERAGES — MILLION SQUARE YARDS

	1935-1937	1949	1950	1951	1952	1953	1954*
IMPORTS	3	70	56	86	26	21	45
Percentage from:							
Japan	100	60	42	27	56	61	22
India and Hong Kong	—	—	35	37	12	9	37
Other countries ..	—	40	23	36	32	30	41

* Provisionally estimated.

while increasing in 1953, began to decline after the end of the year. Deliveries in Table II suggest that the proportionate increase in export demand was higher than demand for the home market.[22]

[19] This appears to be a reasonable assumption, although it under-estimates the relative increase in export demand. Deliveries to both the home and export trades during the first half of 1950 probably reflected the level of current demand. Trade reports suggest that demand began to fall after the first quarter of 1951 and that there was no increase – except for a small increase in export demand during the fourth quarter of the year – until September 1953.

[20] Yardage figures given in both the tables and the text are quarterly averages throughout.

[21] See page 251.

[22] Comparing the average rate of increase in total deliveries during the last quarter of 1952 and during 1953, with those for the first three quarters of 1952, exports rose by 4 per cent while the home market rose by 2.6 per cent.

A significant change from the pre-war position has been the substantial increase in the imports of foreign woven piece goods for processing and re-export. The cloth, of standard quality widths and types which weavers in the U.K. have when fully employed found unprofitable to produce, has in the last four years been imported principally from Japan, India[13] and Hong Kong.[14] Other countries —mainly Western Europe—have provided about one third.

The fact that cloth has, during the post-war years, been more readily available or cheaper abroad,[15] is not in itself a sufficient explanation for the large scale imports that have taken place. It would also appear more profitable for the country of origin or for converters, who arrange the transactions, to make direct shipments of processed cloth instead of incurring the additional costs of sending the cloth to the U.K. for processing.

The explanation for the relatively small pre-war imports, is to be found in the fact that foreign woven cloth processed in the U.K., was treated under certain tariff schedules as U.K. cloth and thus received a preferential rate.[16] Foreign woven cloth from Japan being considerably cheaper, it paid U.K. converters to arrange for its processing in this country.

In post-war years, there is no such simple explanation. No detailed information showing the countries to which the finished cloth is exported is available but in the first nine months of 1951, 60 per cent went to British West Africa, 25 per cent to other British Colonies and South Africa, and 15 per cent to Foreign Countries — mainly foreign colonial markets.[17] At first sight it is difficult to understand why converters should not arrange direct shipments of the finished cloth from the country of origin, because tariff preferences do not exist in the major part of the British Colonial and West African markets.[18] The explanation is twofold: firstly, all these markets, while not necessarily giving tariff preference to the U.K., have operated licensing control in its favour. Foreign woven cloth processed in this country has been able to satisfy the required proportion of value

[13] Principally low quality piece goods are imported from India.

[14] No figures are published to show the proportion of imports from India and Hong Kong which are for processing. It has been estimated at 40 per cent.

[15] Cloth for processing and re-export enters into the U.K. duty free.

[16] For instance in Argentina. Attempts by spinners and weavers to prevent this competition were successful – in February 1939, it was announced that the Argentine government had issued regulations limiting the issue of sterling at the 'official' rate to payments for British cotton and rayon goods which had been woven and finished in the U.K.

[17] F. S. Winterbottom, 'Trends in Foreign Competition', *The Textile Weekly*, May 9th, 1952. 80 per cent of the cloth exported to West Africa from the U.K. during the period was foreign woven. In South Africa the proportion was 10 per cent.

[18] For instance, tariff preference is given in Gambia and Sierra Leone but not in the Gold Coast and Nigeria which are the important West African markets.

content added in the U.K., to qualify for licences.[29] Secondly, and of less importance, the U.K. finishing section has a monopoly in certain native designs and styles secured during the inter-war years, when the quota system operating in the Colonies limited competition from other countries. Licences available during the post-war years, to import processed cloth from Japan and Western Europe, have not always been fully utilized because of the lack of design copyrights or special skills needed in their process, and converters have been obliged to place orders for these types of cloth in this country. The continuation of this practice, however, is based on the inability of other countries to sell alternative fabrics, and on this depends their long run significance.

Opposition by the U.K. spinning and weaving sections to the import of cloth for processing, has usually arisen only when their orders were low. Such was the case in the first half of 1950, and is the case at present. Similarly, a rise in retained imports[30] has occasioned no disquiet when orders are high, but the current increase in retained imports from India and Hong Kong is causing considerable alarm.[31] If home produced cloth could be substituted for the recent increase in imports of both kinds, the position of the spinning and weaving sections in particular would be improved, but it is clear that the primary reason for the low order books at present is not due to increased imports, whether retained or for re-export, but to the falling of total exports. As can be seen in Table II, deliveries of home woven fabric to the home market were higher in 1954 than in 1953. Exports, including foreign woven fabric, were lower in the former year.

II

Since the 1930s, the home market has been the industry's principal customer. But at the same time, it has been the one for which there is the least information. Table IV is an attempt to throw more light on the subject.

Two alternative methods of estimating home market demand are available. The first is to treat the home market as a residual — that is to add retained imports to the difference between production and home woven exports — the second is to make a direct estimate. Because of the greater information now available and because of the

[29] The proportion in South Africa and generally in the Colonies is 25 per cent but in the remaining Dominions (except Pakistan and India which specify that the cloth must be spun and woven in the U.K.) it is 50 per cent for most types of cloth – a proportion higher than British finishing charges.

[30] Retained imports include an estimated square yardage of made-up woven goods.

[31] Particularly, since imported woven goods do not have to pay the import duty of 17½ per cent.

TABLE IV

U.K. Cotton Industry: Estimated Home Market Delivery of Woven Goods 1937-54

QUARTERLY AVERAGES — MILLION SQUARE YARDS

	Apparel	*Household and Furnishing*	*Industry, Government etc.*	*Surgical Dressings*	*Apparel*		*Household and Furnishing*		*Industry, Government etc.*	
					Cotton	*Rayon and Mixtures*	*Cotton*	*Rayon and Mixtures*	*Cotton*	*Rayon and Mixtures*
1935-37	255	141	95	62	184	71	115	26	94	1
1948	154	62	118	58	94	60	50	12	107	11
1949	172	74	122	56	104	67	57	18	109	13
1950	225	96	144	60	140	85	74	22	129	16
1951	225	103	153	66	136	89	78	26	133	20
1952	182	100	125	52	97	86	72	28	107	18
1953	204	103	117	55	107	98	70	33	96	21
1954*	214	118	141	65	120	94	83	36	116	25

* Provisionally estimated.

difficulty of allowing for variations in stock and work in progress,[32] the second method has been used.

Figures for deliveries of apparel, household and furnishing fabric are available both for 1935-37 and for the bulk of the post-war period.[33] It remains to estimate deliveries to industrial and other users,[34] which in 1948 were responsible for 45 per cent of supplies by yardage to the home market. The procedure adopted has been to calculate deliveries from the 1948 Census of Production and to extrapolate for later years by indices compiled from data published by the Cotton Board and the Board of Trade. These indices,[35] however, are not fully representative[36] so that the series can only be taken as an approximation, particularly for later years.

The surprising feature of Table IV, is the low level of post-war deliveries of apparel, household and furnishing fabric. In 1954,

[32] According to the Textile Committees of the O.E.E.C. (Report on the position of the European Textile Industry, October 1952), the volume of textile output required to replenish stock and work in progress run down at all stages of production and distribution from spinning to retailing, during the Second World War was equivalent to about 12 months' output.

[33] Pre-war figures for cotton are from the *Cotton Working Party Report*, p. 17; those for rayon and mixtures have been calculated from a paper read by Sir Raymond Streat to the Textile Institute in 1947. Post-war data for cotton and rayon is available in the *Board of Trade Journal* up to and including the first half of 1952. (Some of the household fabrics have to be converted into square yardage.) Subsequently, they have been brought up to date by the Cotton Board. Retained imports are included in the pre-war figures but have to be added during the post-war years. In the case of mixture fabric, no post-war information appears to be available and the method adopted is to subtract home woven exports from production and add retained imports.

[34] Surgical dressings have been separately listed because they are appreciably lower in both yarn and labour content per square yard.

[35] Deliveries to industrial and other users consist of converted and unconverted fabric. The index applied to the former is that of deliveries of apparel, household and furnishing fabric. In the case of non-converted cotton fabric, a weighted index of cotton tyre fabric and canvas and duck production has been used and for rayon non-converted fabric an index of rayon tyre fabric production. An adjustment for retained imports and exports has been made both for 1948 and for subsequent years.

[36] For the wide variety of industrial uses, see Wild, op. cit.

total deliveries destined for personal consumption were 16 per cent below the pre-war volume. Deliveries to industrial and other users, however, had risen by 46 per cent.

It is natural to ask how this trend in deliveries of fabric for personal and industrial consumption compares with that for ultimate consumption. The only adequate data for the latter are the figures for real personal consumption of apparel published in the National Income White Papers and the *Monthly Digest of Statistics*, and these refer to the consumption of all textile products. In 1950, when the maximum post-war ultimate consumption of apparel was reached, consumption was about the same as in 1935-37. Deliveries of apparel fabric by the industry were then 12 per cent below their pre-war volume.[37] Between 1950 and 1953, ultimate consumption declined by 10 per cent and deliveries were 9 per cent lower.

Both indices emphasize the comparatively low level of apparel consumption during the post-war years. The reasons for this have been adequately dealt with elsewhere[38] and need not be discussed here. Consumption was low partly because apparel prices have risen higher than prices of goods in general, and partly because of a shift in the demand function in favour of durable consumer goods. The re-stocking of wardrobes, after rationing had been abolished, and the speculative purchases following the outbreak of the Korean war, probably masked a change in consumption patterns.[39]

Table IV suggests the view that relative prices have been of some importance. The considerable increase in the price of raw cotton, while those of rayon staple and filament were rising to a much smaller extent, is the principal explanation for the high rate of expansion of rayon fabric destined for personal consumption before 1952.[40] But in the case of fabric for industrial and other uses, where for technical reasons there is, with the exception of tyre fabric, often a preference for cotton and where consumption depends primarily on the level of activity, post-war deliveries of cotton fabric have been high.

The rapid increase in rayon deliveries for personal consumption in 1953, when the price differential had narrowed considerably, was

[37] Two reasons for this divergence are that deliveries in 1935-37 were higher than personal consumption because of speculative purchases by retailers and wholesalers, while in 1950, distributors' stocks were run down; and secondly, because the post-war ultimate consumption of other textiles – particularly hosiery – have expanded faster than woven goods produced by the cotton industry.

[38] J. F. Brothwell, *Yorkshire Bulletin of Economic and Social Research*, August 1953.

[39] Cf. footnote 17.

[40] The price per pound of American middling $\frac{1}{16}$ in. cotton rose from 5.1 pence per pound in 1938 to 46.5 pence in 1951, and then fell to 36.1 pence at the end of 1952, since when it has changed little. Viscose filament rayon rose from 28.5 pence in 1938 to 54.0 pence in 1951, while viscose staple rayon increased from 11 pence to 24.9 pence. The changes since 1951 in rayon prices have been relatively small.

due principally to uncertainty of future raw cotton prices. There was, in fact, a greater boom in demand for rayon during that year, than after the outbreak of the Korean war. In 1954, when raw cotton prices were more stable, cotton fabric retrieved some of these losses, particularly in apparel fabric.

A more detailed examination of deliveries in 1954 suggests that while the rate of cotton and rayon deliveries of household and furnishing fabric and fabric to industrial users rose during the latter part of the year, the same was not true of deliveries of apparel fabric.[41] Because of the high and fluctuating character of demand during the post-war years,[42] little is known about the seasonal behaviour of demand, but in so far as the pre-war pattern is continuing to operate, and evidence during 1953 suggests that it is, the decline in apparel deliveries during the latter part of 1954 is contrary to what would normally be expected at this time of the year. The 'normal' pattern is for increased home trade orders to be placed with the producing sections in September, October and November. Orders then decline, falling sharply after February.[43] Other things being equal, therefore, producers can expect no marked rise in ordering from the home trade before September 1955.

The view is held in the industry that the main reason for falling demand for apparel fabric is that distributors are speculatively withholding orders in expectation of falling raw cotton prices in the new year, and of increased supplies of cheap cloth from India and Hong Kong. That this factor exists cannot be gainsaid, but the rise in deliveries of household, furnishing and industrial fabric, together with the fact that the turnover of stocks to sales in wholesaling is falling more than is normal for this time of the year, suggests that it may not be of great significance. Of more importance is the fact that the rate of increase in ultimate consumption of apparel has declined since 1953 for the same reason that it tended to remain low after 1950. Consumers are spending an increasing proportion of their real incomes on durable goods and a decreasing proportion on apparel.

III

The main changes in market outlets for the industry's exports of piece goods (by volume) between 1935-37 and 1953 are given in Table V.

[41] Cotton apparel fabric remained relatively stable, while rayon apparel fabric declined.

[42] The official licensing system in operation until the end of 1951, tended to mask any seasonal ordering that would otherwise have emerged.

[43] This seems to have applied to all types of fabric including industrial.

TABLE V

U.K. Cotton Industry: Exports of Piece Goods (by volume) 1935-37 to 1953

	U.K. exports by markets (1935-37 = 100)									*Share of market in total U.K. exports*	
	1935-37*	1946	1949	1950	1951	1952	1953	1953* Jul. to Dec.	1954* Jan. to Sept.	1935-37*	1953
Far East	100	11	41	32	28	24	17	17	11	24	10
British Colonies	100	45	100	81	81	104	81	107	77	14	31
South America	100	2	8	5	4	2	2	1	2	12	1
Middle East	100	33	37	33	40	54	30	25	21	4	3
Union of South Africa ...	100	73	73	83	114	54	81	77	82	7	12
Australia and New Zealand	100	93	138	123	153	73	86	110	117	9	18
Scandinavia	100	17	46	57	60	39	40	36	36	5	5
Western Europe	100	6	7	17	16	8	22	18	12	4	2
Canada	100	15	46	35	23	26	29	25	17	4	2
U.S.A.	100	54	53	88	93	77	107	107	77	1	1
Total of above markets ...	100	31	58	52	56	44	45	47	41	84	85
Remaining markets ...	100	32	33	47	44	40	43	44	47	16	15
All markets	100	31	54	51	54	43	44	47	42	100	100

* Annual rate.

The markets[44] are divided into two groups. The first group, consisting of the Far East, the British Colonies, South America and the Middle East, normally import low quality goods,[45] dissimilar to those consumed in the U.K. home market; while the second group import higher quality piece goods of home market styles.

The trend in the inter-war years for U.K. exports to the former group of markets to fall, has been continued during the post-war period. In 1935-37, these markets were responsible for 54 per cent of the total volume of the industry's exports of piece goods; by 1953, the proportion had fallen to 45 per cent. The Colonies appear to be an exception to the trend, but this is modified when account is taken of foreign woven cloth processed in the U.K. Such cloth was responsible for about half of the industry's exports of piece goods to these markets in 1949-53.

Exports to the higher quality markets have also fallen during the post-war years, with the exception of exports to Australia and New Zealand, but the higher quality markets as a whole are taking an increasing proportion of the industry's exports. In 1935-37, the proportion was 30 per cent and by 1953, 40 per cent. There have

[44] The composition of the market groups used in the tables in this section is as follows:
Far East: India and Pakistan, Indonesia, Malaya, Burma, Ceylon, China (pre-war period only), Hong Kong. British Colonies: West and East Africa, N. and S. Rhodesia and Nyasaland, West Indies, British Guiana.
Middle East: Egypt, Sudan, Iran, Iraq, Turkey, Aden.
Scandinavia: Norway, Denmark, Sweden, Finland.
Western Europe: Holland, Belgium, Germany, France.

[45] South America and some of the Colonial markets, notably West Africa, also import high quality piece goods but these are not U.K. home market styles.

been, however, important changes in the distribution of markets within this total. The proportion of U.K. exports of piece goods to Scandinavia, Western Europe, Canada and the U.S.A. — exports which were more heavily curtailed during the war — fell from 14 per cent in 1935-37 to 10 per cent in 1953, but the proportion to South Africa, Australia and New Zealand rose from 16 per cent to 30 per cent.

Table VI shows that the U.K. share (by volume) during the post-war years has fallen in the majority of markets[46] — the greatest decline in most cases being after 1949[47] — and that in all cases with the exception of the U.S.A., Australia and New Zealand the U.K.'s competitive position has deteriorated, compared with 1935-37.

TABLE VI

U.K. Cotton Industry: U.K. Share of World Markets for Piece Goods 1935-37 to 1953

	1935-37	1946	1949		1950		1951	1952	1953
			1st half	*2nd half*	*1st half*	*2nd half*			
	%	%	%	%	%	%	%	%	%
Far East	21	18	19	18	12	8	8	8	8
British Colonies	56	46	48	39	38	40	41	43	48
South America	38	10	11	10	8	8	8	5	6
Middle East	11	9	8	6	8	9	8	7	6
Union of South Africa	73	56	56	48	59	46	35	42	37
Australia and New Zealand	55	71	66	67	67	63	55	62	59
Scandinavia	57	24	22	27	30	27	23	20	16
Western Europe	38	11	2	2	5	2	3	4	5
Canada	61	5	19	12	11	9	8	5	7
U.S.A.	11	9	25	20	13	20	19	20	13

The most disturbing feature suggested by the table is the fall in the U.K.'s share of certain high quality markets. The greatest proportionate decline has been in the Canadian market — from 61 per cent in 1935-37 to 7 per cent in 1953. In South Africa, Western Europe and Scandinavia, the fall in the U.K.'s share, while not so severe as in Canada, is almost as disturbing, because in each case the U.K.'s position in 1953 has deteriorated compared with the first post-war year, 1946. The securing of goodwill by competitors during the war when supplies from the U.K. were absent, cannot be a completely valid explanation for the fall of the U.K. share in these markets.

Table VI, however, does not reveal the extent to which the fall in

[46] Colonial trade accounts treat imports of foreign woven cloth processed in this country as imports from the U.K.

[47] Cf. page 245.

U.K. exports of piece goods, was caused by the decline of the U.K. share in individual markets and how much was caused by a reduction of total imports of those markets — i.e., the extent of the decline of U.K. exports that would have occurred even if its 1935-37 share of a particular market's reduced imports had been maintained. This information is given in Table VII below.[48]

U.K. exports of piece goods declined by 51 per cent between 1935-37 and 1949-53. About a third of this decline was caused by

TABLE VII

	% *of total loss of U.K. exports due to:*		
	Lower Total Imports	*Competition from Japan, India and Hong Kong*	*Competition from other countries*
Far East	15.4	—	16.2
British Colonies	0.8*	2.0	2.7
South America	17.0	—	5.1
Middle East	2.4	—	1.6
Union of S. Africa	—	—	9.5
Australia and New Zealand	4.3*	1.6*	—
Scandinavia	—	—	11.5
Western Europe	—	2.4	10.5
Canada	—	0.4	10.3
U.S.A.	0.8	0.4*	—
Total of above markets†	30.5	2.8	67.3

* Gain. † Totals do not necessarily agree because of rounding-off of figures.

reduced imports in markets taking low quality goods;[49] and about two thirds was caused by the inability of the industry to maintain its share in expanding markets.

In the U.S.A., Australia and New Zealand, the industry increased its proportion of total imports in 1949-53 — at the expense of Japan — but in the four remaining expanding markets[50] its share fell. If the industry had maintained its 1935-37 share in South Africa, Scandinavia, Western Europe and Canada, then about two fifths of the total loss of piece good exports would have been avoided.

The disquieting feature of Table VII is that nearly the entire loss

[48] The results can only be approximate since imports from the U.K. in particular markets and U.K. exports to these markets do not always agree.

[49] An important reason for these reduced imports in the Far East, South America and the Middle East, was the development of local cotton industries in Pakistan, Argentina and Egypt. U.S.A. imports in 1935-37 were abnormally high because of competition in the home market from Japan, and there has been little reduction of specialty imports during the period.

[50] The average annual imports of these markets in 1949-53 (1935-37 = 100) was: South Africa 137; Scandinavia 160; Western Europe 290; Canada 230.

in U.K. exports, resulting from the decline in its share of markets (i.e., about two thirds of the total loss) was caused by the substitution of exports from Western Europe, and the United States. It is disquieting because in the 1930s, the industry not only maintained, but improved its competitive position with Western European exporters and the U.S.A. This is shown in Table VIII below.

There are some similarities in the trends operating during the 1930s and the post-war years. In the former period, the industry's exports declined by 49 per cent and in the latter period by 51 per cent; and the major part of the losses resulting from reduced overseas imports, was, in both periods, incurred in low quality markets. But here the similarities end. In the period 1927-29 to 1935-37, the entire loss of the industry's exports was caused by increased competition from Japan, India and Hong Kong, and by lower total imports in overseas markets. There was no net loss from Western

TABLE VIII

U.K. Cotton Industry: Decline in Piece Goods Exports 1927-29 to 1935-37 (on a volume basis)

	% of total loss of U.K. exports due to:		
	Lower Total Imports	*Competition from Japan, India and Hong Kong*	*Competition from other countries*
Far East	36.6	38.2	—
British Colonies	3.5*	1.3	—
South America	3.2	2.1	—
Middle East	2.0	10.7	—
Union of S. Africa	5.5*	—	1.4*
Australia and New Zealand ..	—	4.9	—
Scandinavia	2.5*	—	1.6*
Western Europe	3.7	..	0.2
Canada	0.3	—	1.1*
U.S.A.	—	3.0	—
Total of above markets ..	34.3	60.2	3.9*

* Gain. .. Less than 0.1.

European and United States competition. But in the period 1935-37 to 1949-53, the loss resulting from competition from Japan, India and Hong Kong was slight and the industry could have increased its exports by about two thirds if it had maintained its 1935-37 share of markets with Western European exporters and the U.S.A. Nearly two thirds of this increase would have been in high quality markets.

How far have reduced preferential arrangements been responsible for the greater decline in U.K. exports of piece goods during the post-war years?

In South Africa, Canada, Australia[81] and New Zealand, to which 32 per cent of the industry's exports of piece goods were sent in 1953, the tariff rates of the middle 1930s are still applicable. In the Colonial markets (to which a further 31 per cent of exports were sent), the preferential position of the U.K. has, on the whole, been reduced because a greater proportion of licences have been issued to competitors during the post-war years than under the quota system of the 1930s.[82] In Western Europe, there has been no change but in the Scandinavian countries, particularly in Denmark, a licensing system was normally operated during the 1930s which gave preference to the U.K.[83] This is not so today. Finally, in the Far East, the U.K.'s preferential treatment has been reduced, principally in Pakistan and in Burma.

On balance,[84] preferential arrangements were not as favourable for the industry during the post-war years as they were in the 1930s; but this does not explain the deterioration of the industry's position in all overseas markets — for instance in South Africa, Canada and Western Europe, where there has been no change in preferences over the period.

It is of some interest, therefore, to examine the trend in the industry's exports during the period 1910-13 to 1927-29 when, although preferences for the U.K. existed in the Dominions, they were less favourable to the industry than those in the 1930s and those since the Second World War.

Details given in Table IX which show the extent to which the decline in U.K. exports of piece goods was due to reduced total imports in overseas markets and to competition, must be treated with the greatest reserve. Estimates of total imports in many markets are not always available in the form required, and use has had to be made of a very diverse source of estimates, particularly for the pre-war period. None the less, it is believed that the table is sufficiently reliable to illustrate the general situation.

Reduced total imports, mainly in low quality markets, were responsible for about a quarter of the total decline of the industry's

[81] In Australia, the tariff rates are specific and their effect has been reduced during the post-war period.

[82] This does not apply to British East Africa where the industry's share has increased considerably since the war.

[83] This was also true for the South American countries, notably the Argentine.

[84] The industry sent 80 per cent of its exports in 1953 to the markets dealt with in the previous paragraph.

TABLE IX

U.K. Cotton Industry: Decline in Piece Goods Exports 1910-13 to 1927-29 (on a volume basis)

	% *of total loss of U.K. exports due to:*		
	Lower total Imports	*Competition from Japan and India*	*Competition from other countries*
Far East	20.4	45.8	1.4
British Colonies	—	1.4	0.5
South America	3.2	1.1	4.7
Middle East	2.2	5.6	3.8
Union of S. Africa	—	0.8	—
Australia and New Zealand ..	0.6	0.1	—
Scandinavia	0.7*	—	0.8
Western Europe	—	—	3.8
Canada	0.1	..	1.5
U.S.A.	—	..	0.4
Total of above markets† ..	25.8	54.7	17.0

* Gain. † Totals do not necessarily agree because of round-off of figures.

piece good exports, and competition for about three quarters. The greater part of the loss from competition was due to increased exports from Japan and India — almost entirely in low quality markets. Competition from Western Europe and the U.S.A., which was responsible for about a quarter of the industry's total decline in exports, was most important in absolute terms in the lower quality markets but was responsible for the entire decline of the U.K. share in Scandinavia, Western Europe, Canada and the U.S.A.[1] It seems clear that competition from Western Europe and the U.S.A. was considerably more significant in the 1920s than in the 1930s. None the less, the losses in the 1920s when sterling was overvalued and when the proportion of low quality markets to international trade in piece goods was high, compare favourably with the losses incurred by the industry during the relatively advantageous conditions enjoyed since the Second World War.[2]

[1] The U.K. share of these markets in 1910-13 and 1927-29 respectively, is estimated as follows: Scandinavia, 56 per cent and 43 per cent; Western Europe, 77 per cent and 42 per cent; Canada, 80 per cent and 38 per cent (almost entirely caused by competition from the U.S.A.); U.S.A., 78 per cent and 61 per cent.

[2] The percentage share of international trade in piece goods of the six high quality markets (on a volume basis) for the years 1910-13, 1927-29, 1935-37 and 1949-53 respectively is: 9, 12, 16, 28. For the same years the percentage share of the four low quality markets was: 69, 72, 62, 49. The trend in total imports (1935-37=100) is as follows: Six high quality markets—83, 91, 100, 153. Four low quality markets—155, 135, 100, 153. The remaining markets import mainly low quality piece goods. An index of the total imports of these markets, together with the four low quality markets given above is: (1910-13) 151; (1927-29) 120; (1935-37) 100; (1949-53) 74.

Increased competition is also the explanation for declining U.K. exports of piece goods during 1954. International trade[57] during the first three quarters of 1954 was, on the average, 10 per cent higher

TABLE X

Cotton Industry: International Trade in Piece Goods 1935-37 to 1953 (on a volume basis)

	1935-37*	1948	1949		1950		1951	1952	1953	1954		
			1st half	*2nd half*	*1st half*	*2nd half*				*1st qtr.**	*2nd qtr.**	*3rd qtr.**
International trade (1950 = 100) ...	109	37	86	79	95	105	106	88	92	105	102	98
Percentage share of:												
U.K.	30	27	23	19	17	17	16	16	15	14	13	13
Japan	47	—	15	15	21	21	22	21	24	28	29	31
Western Europe ...	19	20	31	33	31	32	34	35	34	32	31	30
India	1	14	6	13	18	18	12	11	12	15	13	13
U.S.A.	3	39	25	20	13	12	16	18	15	11	14	13

* At annual rate.

than in 1953 but the share held by the U.K. declined from 15 per cent to 13 per cent.

The main competition has been from Japan and to a lesser extent, from India. Japan increased its share from 24 per cent to about 30 per cent, not only at the expense of the U.K., but also of Western Europe and the U.S.A. But Western Europe and the U.S.A. retained, in the first three quarters of 1954, 44 per cent of the world trade in piece goods — compared with only 22 per cent in 1935-37. It is clear that the rapid expansion of exports from Japan after 1949 has been mainly responsible for the fall in U.K. exports but it is also clear that the U.K. has been unable to compensate for this decline by expanding its exports to higher quality markets where competition from Japan has been slight.

No detailed overseas import statistics covering the first three quarters of 1954 are available, but an analysis of exports shows that the decline in the Colonies and the Far East[58] was caused mainly by competition from Japan and India. In Canada and Western Europe, U.K. exports declined because of competition from the

[57] Western Europe in Table X refers to France, Belgium, Holland, Italy, Western Germany, Switzerland and Spain. Exports of these countries are given by weight but at 4½ yds. per lb. 1000 quintals is practically equivalent to 1,000,000 yds. The countries given in the table are responsible for about 95 per cent of the world trade in piece goods.

Figures for international trade enable only a very approximate check to be made on the conclusion derived from import data given in the text. For the period 1910-13 to 1935-37, international trade figures give the loss due to competition as 59 per cent and 41 per cent due to reduced imports (cf. the calculation from import statistics of 54 per cent and 47 per cent respectively). These calculations for the period 1910-13 to 1935-37 thus disagree with the estimate of the Joint Committee (quoted in the *Working Party Report*, p. 5) that the loss due to reduced imports was two thirds and the loss due to competition one third.

[58] These two markets were responsible for the bulk of U.K. exports. See Table V.

U.S.A. and Western European exporters respectively. But in no market does it appear that the rate of total imports in the first three quarters of 1954 was lower than in the second half of 1953.

IV

Several reasons have been put forward for the deterioration of the industry's export performance during the post-war period.

The first is that the price charged by the industry has been too high. Statistical investigation of this view is difficult, because of differences and divergences in types of cloth exported by countries, but an analysis has been made from import statistics of charges in unit values of certain types of cotton fabric. The first market examined is Canada, where the U.K. share has fallen heavily because of competition from the U.S.A.; and the second is Sweden, where the preferential licensing system[68] before the war was not as favourable to the U.K. as those in other Scandinavian countries and where the U.K. has lost considerable ground to Germany, Belgium and Holland.

A rise in the percentage of U.K. unit values to unit values of competitors[69] means a relative increase in U.K. unit values and may be expected, other things being equal, to result in a fall in the proportion of imports from the U.K.

TABLE XI

Canada's Cotton Fabric Imports from the U.K. and the U.S.A.

	*Grey Cotton Fabric**					*Piece Dyed Cotton Fabric*				
	Volume (million lbs.)		*U.K. unit values to U.S.A. unit values*	*Unit values (Canadian cents per lb.)*		*Volume (million lbs.)*		*U.K. unit values to U.S.A. unit values*	*Unit values (Canadian cents per lb.)*	
	U.K.	*U.S.A.*	*per cent*	*U.K.*	*U.S.A.*	*U.K.*	*U.S.A.*	*per cent*	*U.K.*	*U.S.A.*
1935	3.2	2.1	121	29.6	24.5	3.3	0.71	79	53	67
1936	2.6	2.7	127	32.4	25.5	3.5	1.1	82	50	61
1937	3.7	4.6	130	38.1	29.3	3.4	1.1	89	55	62
1938	2.7	2.4	157	35.4	22.6	2.4	1.0	98	58	59
1948	1.7	20.4	110	103	93	3.3	7.5	121	208	172
1949	0.57	20.6	153	116	76	2.9	8.8	123	200	162
1950	0.24	14.3	133	114	86	1.6	8.4	95	164	173
1951	0.16	14.4	123	121	98	1.0	10.2	112	200	179
1952	0.10	12.5	161	123	76	0.7	16.7	117	173	147
1953	0.16	11.8	157	111	71	1.1	17.3	122	165	147
1954†	0.10	8.6	193	127	66	0.84	16.9	116	174	130

* Woven cotton, not bleached, mercerized, or coloured. † Annual rate.

Between 1935 and 1938, U.S.A. unit values for grey cotton fabric were lower than those of the U.K. but the U.K. held about 50 per

[68] There was no tariff preference for U.K. fabric in Sweden, either before or after the war.

[69] Subsequently referred to as 'the percentage ratio'.

cent of the trade. This was possible mainly because of tariff preferences.[61] The quantity of imports from each country, in individual years behaved much as would be expected given no changes in types and qualities of fabrics.[62] U.K. values were becoming relatively dearer, preferential treatment was being reduced, and the U.S.A. increased its share of the market. During the post-war years, on the other hand, there is no such relationship between unit values and imports. The U.S.A. held the bulk of the market although the percentage ratio was not markedly different than in 1935-38. Moreover, in 1950 (following devaluation), and in 1951 when the ratio fell, imports from the U.K. continued to decline. These facts suggest that relative prices have not been the sole consideration determining the share of trade of the two countries during the post-war years.

The behaviour of unit values appears to be more satisfactory in explaining the losses of the U.K. in piece dyed cotton fabric. Between 1935 and 1938, U.S.A. unit values were higher than U.K. unit values, but in the post-war years, with the exception of 1950, they have been lower and the U.S.A. has increased its share of the market considerably. None the less, the percentage ratio after 1949 has been more favourable to the U.K. than in 1948 and 1949 but this has not resulted in the U.K. recovering the proportion of the trade it held in the latter two years.[63]

High unit values appear to be of more importance in explaining the U.K.'s poor post-war performance in the Swedish market.

Before the war U.K. unit values were lower than the German for Item 1034 and tending to grow relatively cheaper, with the result that the share of the U.K. was both high and increasing. Since the war U.K. values have been higher and the position of the U.K. has deteriorated considerably.[64] Imports from Belgium, insignificant in 1935-38, have become more important than imports from the U.K. — Belgian unit values having tended to be both lower and

[61] In 1935, the duty on grey cotton fabric from the U.K. was 17½ per cent+2 Canadian cents per lb. and the U.S.A. was charged the General Rate of 25 per cent+4 cents. After 1935, the U.S.A. was subject to Intermediary Rates and its duty fell to 20 per cent+3½ cents; while the U.K. rate was lowered 15 per cent+3½ cents. In 1938, the U.S.A. rate was reduced to 17½ per cent+3 cents per lb. There have been no changes since.

[62] Between 1927 and 1929, when the U.S.A. held about three-quarters of the grey cotton fabric trade, and was tending to increase its share, U.K. unit values were lower than those of the U.S.A. (the average percentage ratio was 87 per cent). Although tariff preferences were smaller in the period. this is not sufficient to explain the low proportion of the trade held by the U.K., and it seems likely that imports from the U.K. were of lower quality than in the late 1930s.

[63] The reason may be that the long period elasticity of imports in relation to price would have been higher.

[64] But there was no improvement in the U.K. share of the market between 1948 and 1951, despite the fall in the percentage ratio.

TABLE XII

Swedish Cloth Imports from the U.K., Germany, Holland and Belgium

	Item 1034*							*Item* 1038†						
	Quantity (000 *metric tons*)			*U.K. Unit values*		*Unit values* (000 *Kroner per metric ton*)		*Quantity* (000 *metric tons*)			*U.K. Unit values*		*Unit values* (000 *Kroner per metric ton*)	
	U.K.	*Germany*	*Belgium*	*Germany* %	*Belgium* %	*U.K.*	*Germany*	*Belgium*	*U.K.*	*Germany*	*Holland*	*Germany* %	*Holland* %	*U.K.*	*Germany*	*Holland*
1935	378	58	—	113	—	2.8	2.5	—	449	18	1112	49	120	6.3	12.9	5.2
1936	292	13	—	65	—	2.8	4.3	—	519	23	—	60	—	7.8	13.1	—
1937	396	10	—	58	—	3.3	5.6	—	672	25	575	58	140	7.6	13.0	5.4
1938	273	17	—	75	—	3.0	4.0	—	617	24	1838	63	144	7.6	12.1	5.2
1948	136	14	424	117	101	8.2	7.0	8.1	203	1.0	159	37	112	20	54	17
1949	262	817	521	110	112	8.1	7.4	7.2	130	3.6	116	95	122	22	23	18
1951	236	620	413	106	94	11.7	11.1	12.4	506	81	328	109	136	31	28	23
1952	56	205	466	116	122	12.9	11.1	10.6	180	236	228	121	137	31	26	23

* Fabric, undyed and unbleached, weighing 100 grammes or more per square metre and not exceeding 60 warp and weft threads per square centimetre.
† As 1034 but containing more than 60 warp and weft threads per square centimetre.

to decline to a greater extent than the U.K.'s. It would appear, moreover, that U.K. values are more inflexible than both German and Belgian values. The percentage ratio with each country fell between 1949 and 1951 despite the fact that higher margins could probably have been secured in the latter year; while in 1952, when competition was much stronger the ratios rose, and the U.K. share of the market fell.[65]

In Item 1038, the pre-war fluctuations in imports from Holland, and the wide difference between U.K. and Dutch unit values on the one hand, and German unit values on the other — suggesting that a lower quality fabric has been imported from Germany after 1948 — must make any conclusions very tentative. Before the war, unit values of imports from Holland were lower and the percentage ratio was moving against the U.K. with the apparent result that the Dutch held the major share of the trade and were tending to increase it. In the post-war period, the percentage ratio has been lower and the U.K. has improved its position. The ratio, however, with both Holland and Germany has been a rising one and the proportion of the trade held by the U.K. has been declining since 1948.

The result of this analysis of Canadian and Swedish imports is not conclusive,[66] but four impressions emerge. First, price has not always

[65] The inflexibility of U.K. unit values is apparent in imports into Canada and is also evident in 1938. Post-war losses due to high percentage ratios in depressed years, however, appear to have been proportionately greater than before the war.

[66] For examples of the multitude of fabric constructions and finishes produced by the industry and the dangers of arguing on the basis of such broad classifications as those utilized above see: 'A Note on the Merchanting of Lancashire Cotton Goods', *Manchester School*, 1947.

been the primary explanation for lower post-war imports from the U.K.[67] Second, where high post-war U.K. prices appear to be a contributing factor, the differential is not great and generally, it is not beyond the industry's power to meet.[68] Third, the elasticity of imports with respect to price seems high. Finally, price inflexibility appears to have become more significant during post-war years and to have had an unfavourable influence on the demand for U.K. exports.[69]

The second reason put forward to explain the deterioration in the industry's competitive position, is that orders have been lost because of extended delivery times. It is this factor that converters tend to stress most. They point out that they are at a disadvantage, especially in times of increased international competition, because producers in this country are still working off accumulated orders and their delivery dates for new orders are not as favourable as those quoted by competitors. There can be little doubt that the industry's position in this respect is much less favourable than it was in the 1930s.

What has happened is that the relative inability of the industry to expand production during the post-war years has revealed that the manufacturing cycle[70] is a long one. It is estimated as approximately four months: spinning requires perhaps seven to ten weeks, of which two to three are necessary to secure sufficient supplies of basic material for production to be maintained on a continuous basis. Cloth is in process approximately four to six weeks in weaving and three to four weeks in finishing.

Before the war, the length of this cycle was not apparent because of excess capacity and of the ease with which production could be increased. Normally there were producers with an unhedged position in work in progress — and very often in stocks of fabric — so that

[67] There is further supporting evidence. For instance, a comparison of the post-war rise in wholesale prices of yarns and fabrics and the relative changes in wages and output per head in the main exporting countries do not point to any great deterioration of the U.K.'s position since the war. (There has, however, been a great extension of double and even triple shift working elsewhere.) Discussions with converters also suggest that high prices have not always been the most important factor and that European and U.S. prices are rarely more than 5 per cent less than U.K. prices and are sometimes higher.

[68] Bearing in mind the numerous reports by the Cotton Board and the Shirley Institute showing the reduction in costs available from re-deployment and the concentration of production in the more efficient plants.

[69] Cf. D. C. Shaw, 'Prices and Costs in the Cotton Industry', a paper read to the *Manchester Statistical Society Study Group* in 1951, and E. Devons, 'Statistics of U.K. Terms of Trade', *Manchester School*, September 1954.

[70] The average interval that must elapse between the time the raw material is put into process in the spinning section and the time it emerges from the finishing section in the form of processed cloth, making allowance for the average delay in arranging supplies of basic raw material in spinning and assuming no variation in stock and work in progress for the industry as a whole.

delivery times were usually far shorter than the manufacturing cycle. But since the war, producers have generally been in a stronger position than distributors and have worked only to order. The consequence is that delivery times have been longer than the cycle.

The implication is that under the changed conditions of labour supply, the relative shortage of which may well be a long term factor limiting expansion, converters will either require to hold a larger ratio of stocks to sales or to ration supplies for the home market, if they wish to expand the export trade. But discussion with members of the industry, and what little statistical evidence exists, suggest that converters have not been holding a higher ratio of stocks during post-war years:[71] while it is apparent that the removal of controls in August 1949 has resulted in a tendency to supply the home market.

The final explanation suggested to account for the inability of the industry to expand its exports is that it has no desire to do so. Home market demand generally has been increasing and the industry has seen no reason to endure the greater risks and lower turnover of capital involved in the export trade. Whether this is true or not depends in part on the attitude of the converter who is still essentially the distributor of the industry's production of fabric for the export trade. During the inter-war years, the general accusation against the converter was that, having no capital sunk in production, and in many cases coming to the industry from abroad (at a time when it possessed a virtual monopoly in the production of certain kinds of fabric) he had no particular incentive to export Lancashire production when conditions became more competitive. The criticism more relevant to present conditions, however, is that the changed structure of converting may have brought about a similar lack of incentive to export. Converters who export to markets consuming types of cloth similar to those delivered to the U.K. home market, sell both to home and foreign markets and may not therefore have the same incentive to export as those based solely on the export trade.[72]

There is no conclusive way of assessing the importance of this

[71] What converters have been doing is to order in anticipation of demand — roughly half of the orders with the producing sections at any time are not backed by firm orders from the point of view of the converter. This, however, is not the same as keeping stocks. Pre-war stock rates given in the *Working Party Report* (p. 111) are higher than those given in the 1948 Census of Production but this, by itself, can hardly be taken as conclusive.

[72] There has not necessarily been any decline in specialization because of this factor. Converters exporting cloths similar to those consumed in the U.K. market have always dealt in both the export and home markets. What has happened is that the changed distribution of U.K. exports has resulted in these converters becoming relatively more important than converters who cater for markets that take styles dissimilar to the U.K. market, and who normally specialize on the export trade.

factor; but knowledge of the industry[73] and the fact that exports in the post-war period have been directed mainly to markets where the industry's preferential treatment is greatest suggest that it is of some significance.'[74]

Three reasons which have been put forward to explain the industry's inability to expand exports during the post-war years have been examined in this section. The truth would appear to be that no single factor can be held responsible but that all three have been operating together. Converters cannot be expected to have any incentive to export if prices are both high and inflexible and if delivery times are extended; while the producing sections have no incentive to quote lower prices and give preference to exports if converters tend to supply the home market.

In many ways the post-war trend in international trade is more favourable to the industry than it was before the war. On the one hand, the higher quality markets have expanded their share of world trade and thus increased the prospects for an industry which is best fitted to export high quality and speciality goods; while on the other, rapid technical development in cotton and rayon finishing, together with the introduction of new synthetic fibres, have introduced the greater possibility of blending and choice for which an advanced country, able to progress in the application of science, has an advantage. At the same time, the nature of the competition confronting the industry changed. Japan increased its share of international trade in piece goods considerably from the beginning of 1949 but the share held by Western Europe and the U.S.A. during the first three quarters of 1954 was twice that in 1935-37 and these are countries with which the U.K. was able to compete during the inter-war years.

Developments in the organization of the industry during the post-war period placed it in a more favourable position to take advantage of these potentialities — both over the long and the short period. The greater dependence of the industry on the home market and the fact that the majority of converters no longer solely specialized on the export trade, enabled the higher risks of the export trade to be borne more effectively. Profits have been high and increased integration between converters and weavers allowed more effective co-operation both for the introduction of new designs and

[73] It is interesting to note that converters have been very much less critical of the activities of the Calico Printing Section as brought out by the Monopoly Commission than they were of price associations in finishing during the inter-war years (cf., for example, the Merchants' Evidence to the Balfour Commission).

[74] Not only converters are involved but also spinners. Yarn exports are conducted directly but they have fallen off even more heavily than fabric exports.

for trade drives in overseas markets. Similarly, strengthened price associations in spinning and finishing gave the industry more power to employ price discrimination, while the higher volume of cloth imports, whether for the home market or for processing and re-export, opened up the possibility of substituting home woven for foreign woven cloth when demand for U.K. cloth declined. About a third of both types of imports came from Western Europe and in 1952 and 1954 the producing sections could have quoted prices at direct costs to secure this trade.

The future of the industry lay in its own power to a much greater extent than it did before the war. This survey has suggested that it has not taken advantage of its greater potentialities.

DEPARTMENT OF ECONOMICS
MANCHESTER UNIVERSITY

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EDITORIAL NOTES

TRACK COSTS AND MOTOR TAXATION

We are asked to point out, with reference to the article by A. A. Walters entitled 'Track Costs and Motor Taxation' published in our April 1954 issue, that Sir Reginald Wilson has never advocated the abolition of interest payments on railway track. All he was saying in the paper quoted by Mr. Walters was that the abolition of interest on track could never be more than a partial and temporary solution to the problem of obtaining a fair balance of public obligations between road and rail.

FACILITIES FOR PUBLICATION OF SHORT NOTES

In Economics generally, but in Industrial Economics particularly, there are difficulties of publication arising from the fact that many pieces of work take so long to carry through to their final stage. It often happens that research workers may spend two or three years before they can prepare the final publication embodying results of important research. Meanwhile, others may well have been working in the same field and could have benefited from early information about the results which were being achieved. Equally, it often happens that the research which has in fact established important results at an early date can only reach final publication after such a delay that proper credit for priority of discovery is not given. In the natural sciences this problem may be solved by publication of preliminary results or of partial conclusions, and several journals render this specialist service. It has been represented to the editors of the *Journal of Industrial Economics* that the journal would perform a useful service if it were prepared to publish shorter notes, limited in their scope in the way which has been indicated. The Board of Editors has therefore decided that it would be willing to give these facilities for prompt publication if such a demand exists. The journal will also be prepared to publish short notes in other cases where this form of publication is convenient. There will, however, be only a limited amount of space available and any notes should be as concise as possible. MSS. should be sent to the General Editor, P. W. S. Andrews, Nuffield College, Oxford, England, and will receive prompt consideration by the editors.